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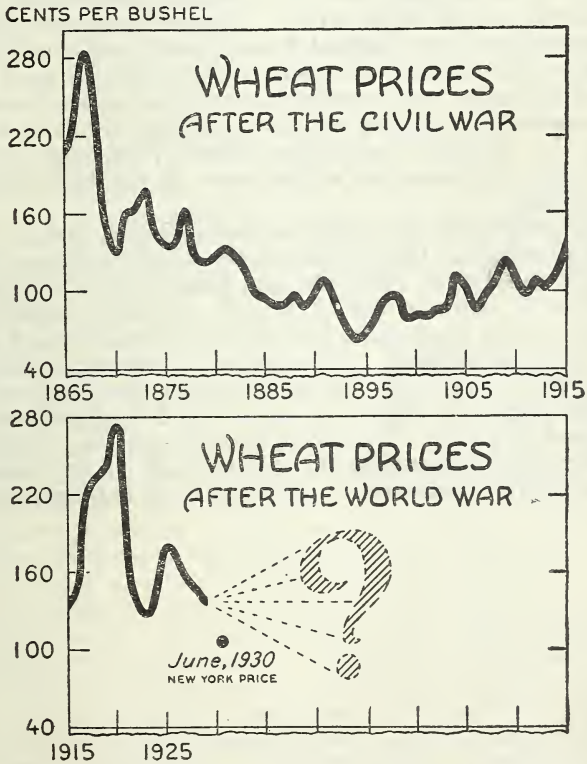
THE WORLD WHEAT OUTLOOK, 1930
AND
FACTS THAT FARMERS SHOULD CONSIDER

Prepared by the Staff of the Bureau of Agricultural Economics



WHAT WILL BE THE FUTURE TREND OF WHEAT PRICES?

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INTRODUCTION

The outlook for world wheat production, not only for 1930 but for some years ahead, and many important facts should be considered by wheat producers in the United States in planning their production. Facts as to the trends of prices, acreage, production, and consumption of wheat, and the factors affecting these, are presented to show the basis for the conclusion presented in the outlook statement.

It is recognized that the possibilities of adjustments in wheat growing in view of the outlook vary in character and extent in different areas and even on individual farms. Representatives of the Department of Agriculture, the Federal Farm Board, and the State agricultural colleges and extension services of the principal hard red winter wheat growing States met in conference at Manhattan, Kans., in June, 1930, to consider the outlook and the problems involved in adjusting production in the hard red winter wheat producing region. The report of that conference on adjustments in the hard winter wheat area is included.

A similar conference was held at Indianapolis, Ind., in August to discuss the problems of the soft red winter wheat producers of Indiana, Ohio, Michigan, Illinois, Missouri, and Kentucky. No general statement relative to adjustments by the soft red winter wheat producers was issued by this conference but the representatives of each State accepted the responsibility for preparing a statement with reference to readjustments that could be made within their respective States. Some charts and data relative to the soft red winter wheat situation are presented herewith. Producers in all States may apply to their State colleges and experiment stations or their county agent for suggestions as to adjustments that may be made advantageously on their farms.

THE WORLD WHEAT OUTLOOK, 1930, AND FACTS THAT FARMERS SHOULD CONSIDER

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THE WORLD WHEAT OUTLOOK

Extensive adjustment in wheat growing, including substantial reduction in cost per bushel, must be made if wheat production is to be profitable to growers generally in the next 6 to 10 years. This is necessary to meet intensified competition in world markets, due to increasing production in this and other countries without a corresponding increase in effective demand.

While improvement is expected over the low level of prices of July, the present prospect is that world wheat prices during the next seven years will average appreciably lower than in the past seven years. In the period July 1, 1923, to July 1, 1930, the price of No. 2 hard winter wheat at Kansas City averaged $1.29 per bushel. The average for June, 1930, was about 90 cents per bushel. As in the past, variation in price is expected. In years of short world crops, with business conditions normal or better, prices will doubtless be much higher than those now prevailing, but in other years large world crops may result in prices even below the present level.

Stocks of wheat increased materially from 1926 to 1929 as a result of increasing crops. From the large crop of 1928 an exceptionally large amount was carried over. A surplus condition persists in spite of a much shorter crop in 1929; although the carry-over into the 1930–31 season is less than last season it is still very large. Under the pressure of the accumulated wheat surplus, reinforced in 1929 by large crops of other cereals in Europe and a world-wide business depression accompanied by a marked decline in commodity prices in general, wheat prices have fallen below the low levels reached in 1923–24.

The present prospect is that the 1930 world wheat crop will be only a little larger than the small crop of 1929, and that world supplies for 1930–31 will be no larger than they were for 1929–30. Recent low prices of wheat, under the influence of unusually restricted demand for wheat and general declines in commodity and security markets, have been below the levels that appear warranted by prospective supplies and demand for the year as a whole; but unless serious crop deterioration should occur this year, prices satisfactory to wheat growers can not be expected until stocks are reduced to more normal size and production is brought in line with consumption. Now that farmers are making their plans for next year's acreage, it is important that the wheat outlook be taken into account, not only for the next 12 months but also for the coming years.

During the past 12 months, as in 1920–21, a decline in the general commodity price level was an important factor in the decline in wheat prices. In the United States, wholesale prices in general declined about 10 per cent from July, 1929, to the end of May. The index number for July, 1930, was 15 per cent below that of a year ago. In many foreign countries prices have declined even more than in the United States. Improvement in the general commodity price level from the present depression is to be expected in the course of the next 12 months, but there is some ground for expecting the broad trend of the general price level to be downward; this would mean that the peak of the next price cycle is not likely to be as high as the high points of the past few years. Wheat prices in the United States are likely to share in the downward trend of the general price level, the extent of the decline depending in part upon the action of wheat growers in this and other countries.

Low wheat prices, such as those recently prevailing, will cause contraction of acreage in some parts of the world; but the trends of wheat acreage and production in the past few years indicate that expansion is likely to continue in many countries even at prices lower than the average of the past seven years. In recent years, in the face of falling prices, wheat acreage has expanded rapidly in parts of the United States, Canada, Argentina, and Australia. The area sown in the southwestern winter wheat States increased approximately 4,000,000 acres from 1924 to 1929. During the same period the area in Canada, Argentina, and Australia combined increased over 10,000,000 acres, from 49,000,000 to 59,000,000. This is in line with the trend in expansion since 1910. The area in the Southwestern States in 1929 was 14,000,000 acres larger than in 1910, while that of Argentina, Canada, and Australia was 28,000,000 acres larger. The expansion of the last few years has been made possible chiefly by improvement in equipment, new wheat varieties, and improved cultivation practices, particularly in regions of scanty rainfall. Thus it has been possible, by large-scale, lower-cost methods to raise wheat on lands hitherto regarded as unsuited for the crop. Large areas of such lands are still available for wheat production at comparatively low costs, in important surplus-producing countries.

Russia, before the late war, was one of the greatest wheat-producing and wheat-exporting countries; in the five crop years 1909 to 1913 exports averaged 164,000,000 bushels a year. Since the war her wheat exports have been negligible except in 1925–26 and 1926–27

when they were small; but Russia is likely to reenter the export field as an important competitor within the next decade. Russia has large undeveloped resources for wheat production. The Soviet Government is making strenuous efforts to introduce machinery and to improve methods of growing the crop. There is reason to expect that these efforts will result in increasing exports and evidently in a large surplus that will be pressed upon the export market.

The world demand for wheat increased rapidly from 1920 to 1929, in part because of recovery in purchasing power in many countries of Europe, but the rate of increase in demand is likely to be slower in the next few years. Population is increasing at a retarded rate. Further increases in purchasing power seem likely to be less notable in the next few years. In the United States and in Anglo-Saxon countries generally, and in France as well, per capita consumption of wheat products is much lower than before the war and shows no tendency to increase. In some countries of continental Europe per capita consumption of wheat has been growing at the expense of rye, corn, and some other foodstuffs; but high tariffs on wheat and flour and other regulatory measures now in effect in many of the wheat-importing countries are tending to check this expansion and even temporarily reverse it by making wheat relatively dear in a period of business depression when economies are necessary. In the Orient, and in general outside of North America, Europe, and Australia, per capita consumption of wheat is apparently on the increase, and this trend may be expected to continue. Altogether it seems probable that world wheat consumption in the next few years will not increase much faster than population increases, except as lower levels of wheat prices may lead to increased per capita consumption in countries where wheat is now a minor element of diet.

Broadly viewed, the outlook is for continuance of severe competition in the wheat export trade. Bumper crops in exporting countries generally, such as occurred in 1928, or short crops in these countries, as in 1929, may not soon be repeated; but the exportable surpluses of Canada, Argentina, Australia, and the Balkan countries are tending upward, and Russia may again become a large exporter within the next 10 years. Such extreme contraction in European wheat imports as occurred in 1929–30 is likely to be temporary, but restrictive measures there tend to check expansion in imports of wheat. World wheat prices are especially sensitive to the relation between export surpluses and the demands of importing countries, and our wheat growers must be prepared to meet increasingly severe competition in international trade.

The outlook for every wheat producer in the United States is affected by world wheat prospects. The significance of these prospects, however, varies to a considerable extent with the relation of supplies to the domestic demand for the several classes of wheat produced.

Soft red winter wheat is consumed largely in domestic markets. In most years since the war this type of wheat has sold for prices well above export price levels. A continuation of the recent tendency to reduce wheat acreage east of the Mississippi River may soon reduce production of soft red winter wheat to a level so low that even in a year of high yields and low abandonment production will not exceed the usual domestic requirements. The price advantages

secured by the soft red winter wheat producer may not, however, be sufficient to offset the tendency toward lower prices for all wheat. Low-protein hard red winter wheat will be substituted for soft red winter to an increasing extent as the price margin of soft red winter increases over hard winter wheats. Producers of soft red winter wheat are therefore concerned with the outlook for other types of wheat.

With the exception of a few years of large crops and heavy carry-overs, our production of hard red spring wheat also has been consumed mostly in domestic markets. As a rule this wheat commands prices more or less above export prices, owing to the tariff that keeps down imports of Canadian wheat. During the past season, prices of this type of wheat have been severely affected by competition of hard red winter wheat and by the general decline of world wheat prices, in spite of the short crop and limited exports of hard red spring. This type of wheat is likely to continue to sell on the average above an export basis, but its price will be influenced not only by the carry-over and production of this wheat, but also by the carry-over, production, and prices of hard winter wheat.

Hard red winter, durum, and the wheats of the Pacific Northwest have to look to foreign countries for a market for a considerable surplus above domestic consumption. In the past seven years these wheats have constituted about 88 per cent of the total exports of unmilled wheat and some of the flour. The unmilled exports of these wheats have averaged nearly 25 per cent of their total production, and more could have been exported without reducing stocks below normal.

Even though the United States produces less than one-fourth of the world's wheat supplies outside of Russia, a material reduction in the crop would result in some improvement in prices. A curtailment in the production of export wheats would not only tend to raise the world wheat price level but it would also improve the relation of domestic to foreign market prices. Over a period of years, however, the initial increase in the world price of wheat resulting from a diminution in our exports probably would be offset in some degree by expansion in production and exports of other countries, but a large part of the improvement in domestic prices in relation to world market prices probably would remain.

With the world situation pointing to a lower level of prices in the next 6 to 10 years than has prevailed in the last 7 years, farmers should seriously consider whether their land, their farm organization, and their farm practices are suitable for wheat production under these prospective conditions. Adjustments should be made not so much in view of the experience of the past few years as in view of the prospects for several years ahead.

In some areas a portion of the wheat acreage may well be devoted to other crops or to livestock. Shifts, however, should be made only after a careful study of the prospects for profitable returns. In the aggregate these shifts should not go so far as to produce burdensome surpluses of other commodities. The more extensive use of soil-improvement crops, such as sweetclover, fallowing a larger portion of the land in the drier sections and even leaving the least-productive land unplanted should be given consideration.

Even in the newer wheat areas, where the new, low-cost methods have been accompanied by rapid expansion of total acreage, wheat growing on land least suited to the new low-cost methods of production may have to be abandoned. Establishment of new wheat-growing enterprises under present and prospective price conditions is likely to be hazardous, unless it can be done on land where lower production costs are possible. Everywhere attention should be given to possibilities of reducing production costs as one of the means of meeting competition.

The possibilities of adjustment in wheat growing vary in character and extent in the different areas and even on individual farms, and specific application of the wheat outlook can not be satisfactorily discussed in a brief review of the situation from a national standpoint. Adjustments will be dealt with more specifically in regional and State surveys or conferences by those familiar with local conditions.

IMPORTANT FACTS RELATIVE TO THE WHEAT OUTLOOK

THE TREND OF WHEAT PRICES

In planning wheat production every farmer must necessarily consider not only what it will cost him to produce the crop but also what he can reasonably expect to receive for the product.

The statement in the outlook that "while improvement is expected over the low level of prices in the past month the present prospect is that world wheat prices during the next seven years will average appreciably lower than in the past seven years" is based upon an analysis of the relation of wheat prices to world-wide changes in the general price level and to the production and consumption of wheat.

Wheat prices have recently fallen below the lowest levels heretofore reached since the war. Searching for the causes of this low level of prices, we find three outstanding facts:

(1) The world production of wheat increased rapidly from 1924 to 1928 and the carry-over of wheat increased from year to year to a high level at the end of the 1928–29 marketing season.

(2) While the world consumption of wheat has been increasing over a long period of years, there is a tendency in some countries for the consumption per capita to decline and some countries have imposed restrictions upon imports that tend to reduce the consumption of wheat in favor of substitutes.

(3) A world-wide financial and business depression has been accompanied by a general decline in the prices of all commodities, including wheat.

A careful study of all available facts relative to these factors in the situation seems to indicate that these tendencies are likely to continue for some time. Undoubtedly wheat prices will improve from the low levels of June and July, 1930, but if production continues to expand more rapidly than consumption and the general price level continues downward, the advance from this low price level is not likely to carry prices as high as in 1924, and the average price for the next six or seven years is not likely to equal the average for the period 1923–1929. (Fig. 1.)

The trend of wheat prices since the World War has been downward as it was following the Civil War. A review of the course of prices following the Civil War may throw some light upon the probable course of prices during the next few years. (Fig. 2.) While wheat prices may not continue to decline as rapidly or for as long a period as they did after the Civil War, it is of interest to note that certain factors which caused the decline following the Civil War are now operating in the same direction. Following the Civil War the general price level declined and the production of wheat in the United States expanded rapidly for many years. The effect is apparent in the downward trend of wheat prices through many years. This downward trend in prices finally came to an end and the upward trend in wheat prices previous to the late war was due in large part to conditions that caused an upward trend in the general commodity price level.

THE GENERAL PRICE LEVEL

The processes of readjustment after the World War have resulted in a decline in the general-commodity price level similar to the decline which took place in the United States following the Civil

War. The marked drop in the price level of 1920-21 was followed by some improvement and prices continued to fluctuate around a

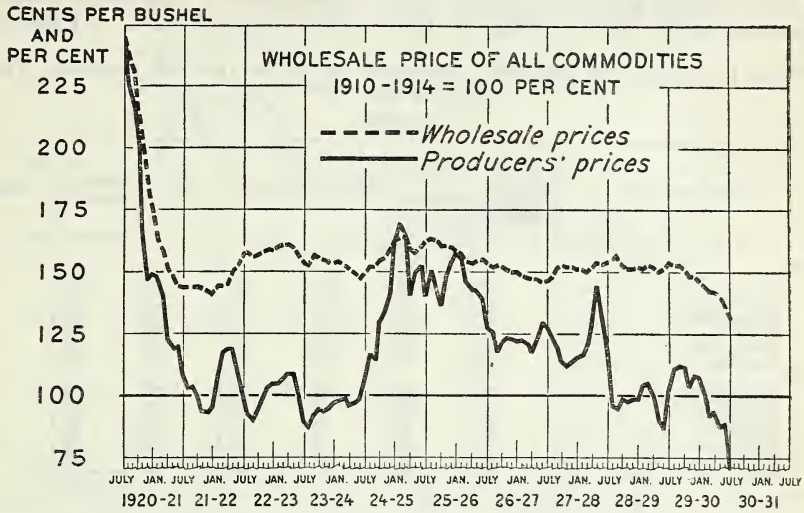

FIGURE 1.—WHEAT PRICES RECEIVED BY PRODUCERS AND WHOLESALE PRICES FOR ALL COMMODITIES, JULY, 1920, TO JULY, 1930

In the past 10 months wheat prices have fallen faster than the general price level, as they did in the depression of 1920. Any marked decline in the general price level is likely to be accompanied by a decline in wheat prices unless the supply of wheat becomes quite short in the face of a general price depression. In 1924, a short world crop followed by a short crop in the United States in 1925 resulted in two seasons of relatively high prices for wheat, but these two seasons have been followed by successively larger world crops and increasing carry-overs until 1929. Large wheat stocks and the decline in the general price level more than offset the influence of the world crop reduction in 1929.

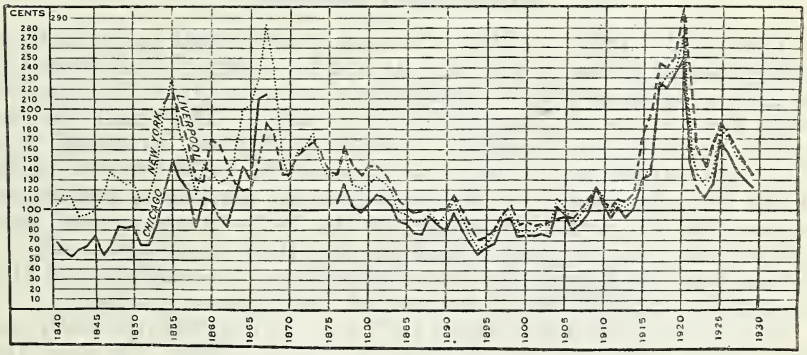

FIGURE 2.—AVERAGE ANNUAL PRICE OF AMERICAN WHEAT, CHICAGO, NEW YORK, AND LIVERPOOL, 1840–1929

In the past 10 years the course of wheat prices has been downward, as it was following the Civil War. In both cases the decline in wheat prices was associated with a decline in the general price level, a deflation from the war-time prices. In recent years the combine and the tractor have become important factors in expanding wheat production, not only in the United States but in other parts of the world, as the reaper and binder contributed to expansion and production after the Civil War. The development of new wheat-growing areas in Canada, Argentina, Australia, and the Great Plains of the United States corresponds to the homestead expansion in the North Central States after the Civil War.

level about 50 per cent above pre-war prices, until recent months. From July, 1929, the price level dropped nearly 15 per cent in 12 months. According to the index of the Bureau of Labor Statistics,

the all-commodity price level for the month of July, 1930, was 84, the lowest since July, 1916, and considerably below the low point of 1921. Many other countries have experienced a downward course in commodity prices similar to that of the United States. (Table 1.)

TABLE 1.—*Indexes of wholesale commodity prices in specified countries, July, 1929–June, 1930*

[1926=100]

Year and month	U. S. Bureau of Labor Statistics	United Kingdom	Germany	France	Italy	Netherlands	Japan
1929:							
July	98	93	103	90	73	97	93
August	98	92	103	83	72	98	92
September	98	92	103	87	72	97	92
October	96	92	102	87	72	97	91
November	94	91	101	87	71	94	89
December	94	90	100	86	70	93	86
1930:							
January	93	89	99	83	69	90	85
February	92	86	96	82	68	87	84
March	91	84	94	80	66	84	83
April	91	84	95	78	66	84	81
May	89	82	94	79	65	81	80
June	87	82	93	78	63	----------	76

A revival in business, together with conditions associated with such a revival, probably will result in some improvement from the present low level. But, considering the world-wide character and extent of the decline in recent months, it seems doubtful that recovery will bring all commodity prices back again to the level reached in 1924–25. (Fig. 3.)

WORLD SUPPLY AND PRICE

The world supply of wheat is always an important factor in determining wheat prices. (Fig. 4.) It will be observed that from 1924 to 1928 supplies increased continuously excepting from 1925 to 1926 when the increase was checked for one season. The result was that prices declined continuously. World production increased from 3,150,000,000 bushels in the 1924–25 season to 3,973,000,000 bushels in the 1928–29 season. In the meantime the carry-over was increasing so that the available supply for the 1928–29 season was about 900,000,000 bushels greater than for the 1924–25 season. (Fig. 5.) Wheat prices in British markets declined from the equivalent of $1.79 to $1.28 per bushel, largely because of this increase in supply.

The effect of the large crop of 1928 and the accumulated carry-over from crops exceeding consumption has been carried over into 1929 and 1930. The carry-over of old wheat on July 1, 1929, was the largest on record. In addition to the accounted for stocks, there were large supplies of old wheat in Europe of which there are no definite statistical records. The crops of the United States, Canada, and Argentina were greatly reduced by unfavorable weather in 1929. The world production outside of Russia and China for the season was about 500,000,000 bushels less than the production of the previous season, but the large stocks of wheat on hand at the beginning of the season offset a large part of this reduction. Furthermore, this record

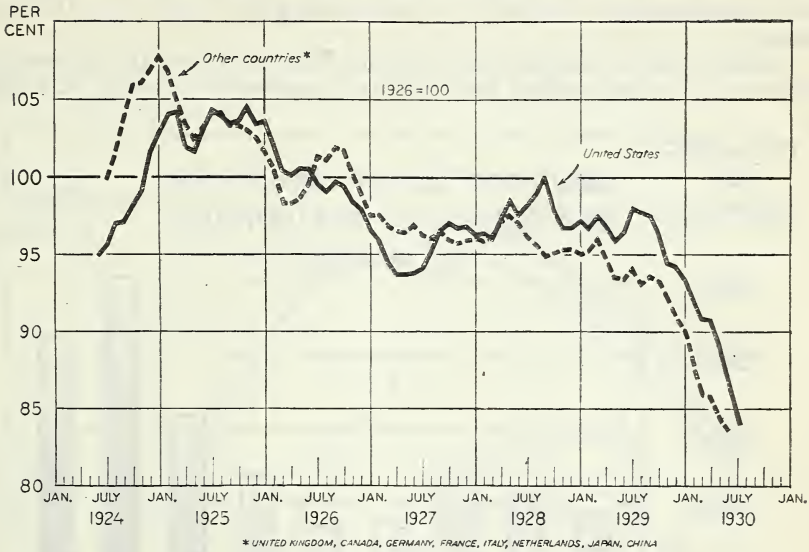

FIGURE 3.—INDEXES OF COMMODITY PRICES IN THE UNITED STATES AND IN COUNTRIES TAKING ABOUT 75 PER CENT OF UNITED STATES AGRICULTURAL EXPORTS

The recent decline in the general commodity price level is world wide. In some countries the decline began earlier and has gone farther than in the United States. Such a decline in prices reduces the purchasing power of consumers and forces producers to take less if they wish to sell what they have.

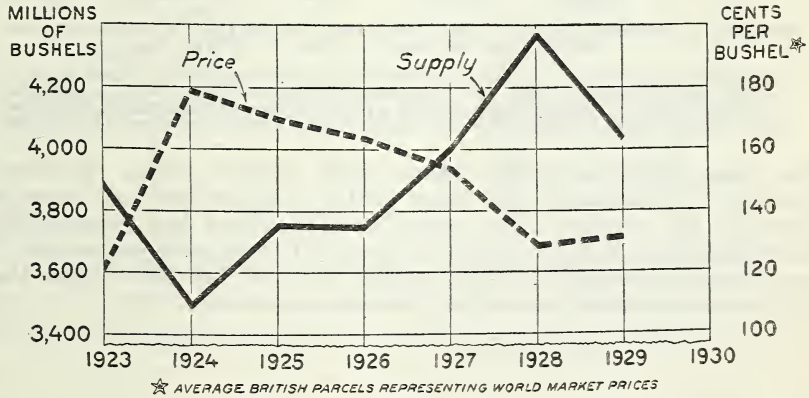

FIGURE 4.—WORLD WHEAT SUPPLIES AND PRICE

World supplies largely determine the price of wheat in world markets when the general price level remains about the same. The large supply in 1923 brought low prices. The small world crop in 1924 resulted in much higher prices. After 1924, supplies increased, reaching the peak in 1928, and again prices moved downward to a low level. Owing to the depression and falling general price level, the shorter crop of 1929 sold at but slightly higher prices than the crop of the previous year.

carry-over added to a comparatively short crop provided a large supply in the face of a material reduction in the demand for wheat, and consequently resulted in a large carry-over into the 1930–31 season.

Possibly the increasing visible supply, due in part to the increasing amounts of wheat carried over from one season to another, has also

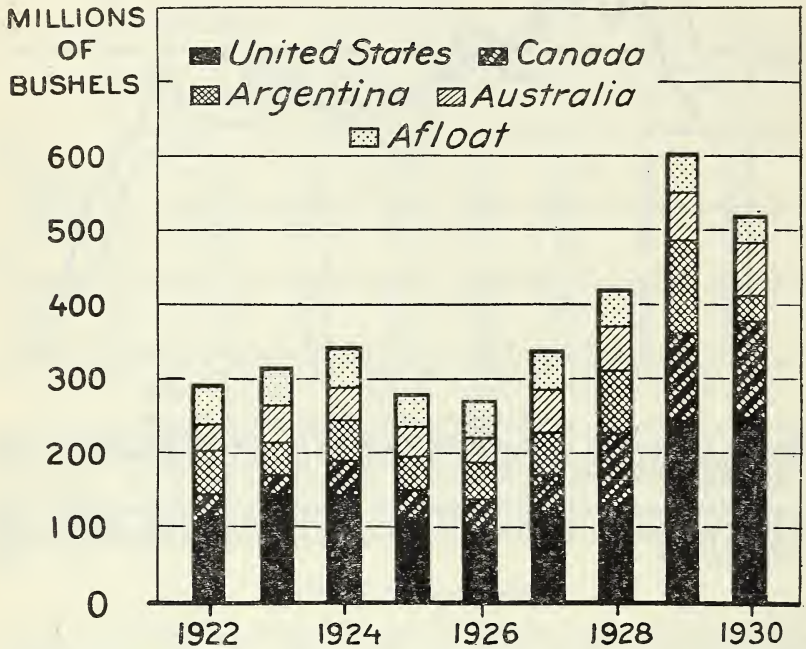

FIGURE 5.—WHEAT STOCKS IN PRINCIPAL EXPORTING COUNTRIES AND AFLOAT, AS OF JULY 1, 1922, TO DATE

Stocks of old wheat as of July 1, the beginning of the wheat-marketing season in the United States, increased rapidly from 1926 to 1929. The world stocks of wheat on July 1, 1929, are probably the record for all time. The stocks at the beginning of July, 1930, were still large but less than a year ago. The unaccounted-for stocks probably have been reduced more than indicated by this chart.

had some significant effect upon world market prices. (Tables 2 and 3.) Undoubtedly the large visible supplies have at times influenced the market. The world visible supply has progressively increased from 1925 to 1930. (Fig. 6.) During the past season, in every month the world's visible supply of wheat has been higher than in the corresponding month of the previous season.

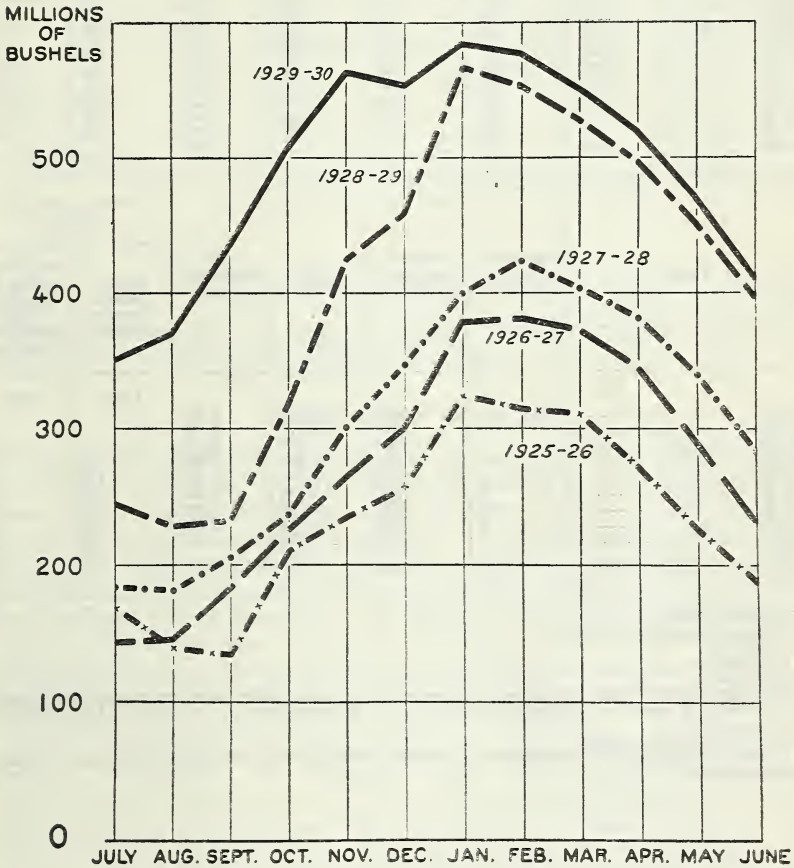

FIGURE 6.—WORLD VISIBLE SUPPLY OF WHEAT JULY 1, 1925, TO JULY, 1930

The world's visible supply of wheat has been increasing each year since 1925. Monthly the visible supplies of the past year have been extraordinarily high.

TABLE 2.—*World wheat supply, price, and disappearance, 1920–21 to 1930–31*

[In million bushels—i. e., 000,000 omitted]

Year	Production						
	United States	Canada	Argentina	Australia	Europe [1]	All other [2]	World production [2]
1920–21	833	263	156	146	949	601	2,948
1921–22	815	301	191	129	1,216	517	3,169
1922–23	868	400	196	109	1,044	608	3,225
1923–24	797	474	248	125	1,257	650	3,551
1924–25	864	262	191	165	1,058	610	3,150
1925–26	677	395	191	115	1,397	666	3,441
1926–27	831	407	230	161	1,210	596	3,435
1927–28	878	480	282	118	1,274	644	3,676
1928–29	915	567	[3] 350	160	1,407	574	3,973
1929–30 [4]	807	294	[3] 160	126	1,456	638	3,482
1930–31	821	365			[3] 1,304		

Year	Shipments from Russia	Stocks [6] accounted for July 1	Total supply	Total disappearance	Average price per bushel	
					British parcels (simple average)	No. 2 hard winter at Kansas City (weighted average)
					Cents	*Cents*
1920–21	(7)	302	3,250	2,942		183
1921–22	(7)	308	3,477	3,187		120
1922–23	7	290	3,522	3,213		113
1923–24	21	309	3,881	3,536	121	105
1924–25	(8)	345	3,495	3,223	179	135
1925–26	27	272	3,740	3,468	170	163
1926–27	49	272	3,756	3,424	163	135
1927–28	5	332	4,013	3,595	152	135
1928–29	(8)	418	4,391	3,802	128	112
1929–30 [4]	6	589	4,073		131	120
1930–31 [5]		[9] 554				

[1] Excludes Russia.
[2] Excludes Russia and China.
[3] Unofficial.
[4] Preliminary.
[5] July report.
[6] Estimates of stocks revised to represent carry-over in the United States and supplies available for export and carry-over in Argentina, Australia, and Canada, the United Kingdom port stocks and supplies afloat.
[7] Not available.
[8] Less than 500,000 bushels.
[9] European stocks reduced 55,000,000 bushels between 1929 and 1930. Comparable data are not available for earlier years.

TABLE 3.—*Wheat carry-over or surplus, July 1, 1920–1930*

[In million bushels—i. e., 000,000 omitted]

Position	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
United States:											
Stocks on farms	50	57	32	36	31	29	21	27	24	45	47
Stocks in country mills and elevators	36	27	29	37	37	25	30	22	19	42	54
Commercial visible [1]	18	10	20	29	39	29	16	26	42	96	113
Merchant mills	[2] 35	[2] 28	[2] 35	[2] 44	[2] 38	23	25	32	32	48	46
In transit						9	7	11	11	16	15
Total, United States	139	122	116	146	145	115	99	123	128	[3] 247	[3] 275
Canada [4]	24	19	42	39	60	42	55	56	114	125	136
Argentina [5]	40	45	59	44	55	45	50	58	78	125	40
Australia [5]	16	44	12	25	23	18	15	36	38	33	45
United Kingdom:											
Port stocks	11	13	9	5	8	9	4	8	10	8	6
Afloat to	22	16	11	16	18	13	16	14	12	8	11
Continent, afloat to	36	36	22	26	18	13	22	21	22	31	17
Afloat to orders	14	13	19	6	18	17	11	16	16	14	10
Total	302	308	290	309	345	272	272	332	418	591	540

[1] Bradstreet's visible supply.
[2] Unofficial.
[3] Does not include holdings of foreign wheat; Canadian wheat in the United States was reduced from 23,000,000 to 16,000,000 bushels and the United States wheat in Canada was increased from 3,000,000 to 5,000,000.
[4] Exportable surplus computed as follows. Years 1920–1923, carry-over August 31, 1920–1923 plus net exports during July and August. Years 1924–1929, carry-over July 31 plus net exports during July. 1930 stocks Mar. 31 less consumption, seed, and exports, Apr. 1–June 30.
[5] Carry-over Dec. 31 plus exports July 1–Dec. 31.

CONSUMPTION OF WHEAT

The world's demand for wheat is increasing. The world supplies of the past two seasons have been far above that of 1923, and yet prices have averaged higher than in that season, which indicates clearly an upward trend in demand. The world's demand increases by growth of population in some countries, by improvement in purchasing power of consumers, and shifts from the less desirable foodstuffs to wheat products. In Russia, for example, the consumption of wheat has been increased so much, both by the growth of population and by the increased per capita consumption, that in the past five years with a production about equal to pre-war production the exports have been reduced to almost nothing.

The consumption of wheat has been expanding rapidly in the Orient. In Japan, for example, where the population has been increasing at a fairly rapid rate, the per capita disappearance of wheat including flour has increased from 0.52 to 0.76 of a bushel, or about 50 per cent in 30 years; and the total disappearance of wheat in the country has increased from 23,000,000 to more than 47,000,000 bushels.[1] According to another recent study of the Food Research Institute, the wheat consumption of tropical countries has increased from an average of 46,000,000 bushels annually before the war to an average of 66,000,000 bushels in the past five years. This is an increase of over 30 per cent. During this period the population of the countries included in this study increased only 21 per cent. For these people the increase in wheat consumption represents an increase in standard of living.

[1] Japan as a Producer and Importer of Wheat. Wheat Studies of the Food Research Institute, Vol. VI, No. 8.

The demand for wheat is of course an important factor in determining price. Keeping in mind that demand is measured by the amount of wheat consumers take at a given price, it is obvious that supply increased more rapidly than demand from 1924 to 1928. The consumption of the food products of wheat in countries such as the United States and the United Kingdom is fairly constant. It does not fluctuate greatly from season to season, and the reducing or raising of prices has very little effect on what these countries consume.

The feeding of wheat in the United States, however, does change in response to price. When wheat prices are low relative to corn prices, the feeding of wheat on farms increases. Likewise, in some European countries, when feed grains are relatively scarce and wheat plentiful, the feeding of wheat may increase. In some countries the food consumption of wheat also varies with the supply of other grains and potatoes, which are used to some extent as substitutes for wheat. Nevertheless, since a large proportion of the wheat crop is utilized for food in countries in which consumption does not change greatly in response to price, marked increases in production from one season to another or over any short period of years are fairly certain to result in a marked reduction in prices.

If all the population of the world was increasing wheat consumption as rapidly as are the people of Russia, Japan, and tropical countries, and would continue to do so, the demand for wheat would increase so rapidly that prices could be maintained in the face of a very rapid expansion in production. But unfortunately for the wheat grower, many of the most important consuming countries of the world are not increasing consumption as rapidly as the countries mentioned.

THE EUROPEAN DEMAND FOR WHEAT

Europe, outside of Russia, consumes a very large part of the world's wheat crop. The population of some of the European countries is increasing at a slow rate. In some countries there is a tendency to shift from the use of rye and other grains as foodstuffs to wheat, but in some of the deficit-producing countries this tendency is held in check by higher protective duties on wheat and other measures intended to protect domestic producers even at a high cost to consumers. During the late war these countries temporarily abandoned protective tariffs. They wanted supplies from any source and as cheaply as possible. Soon after the war, however, they reimposed protective duties and during the past few years, as prices declined, the tariff walls were raised higher. (Fig. 7.) In Germany, where rye is important, increases in duties have been supplemented by other measures restricting the amounts of foreign wheats that could be used and otherwise protecting the domestic market, for the purpose of maintaining prices of domestic wheat and rye and increasing the consumption of the rye of which that country had a surplus. All such measures, of course, tend to reduce the world's total demand for wheat. During the past year these measures have been an important factor in reducing European takings of wheat, increasing the world carry-over, and consequently reducing world market prices of wheat for the present season. (Tables 4 and 5.)

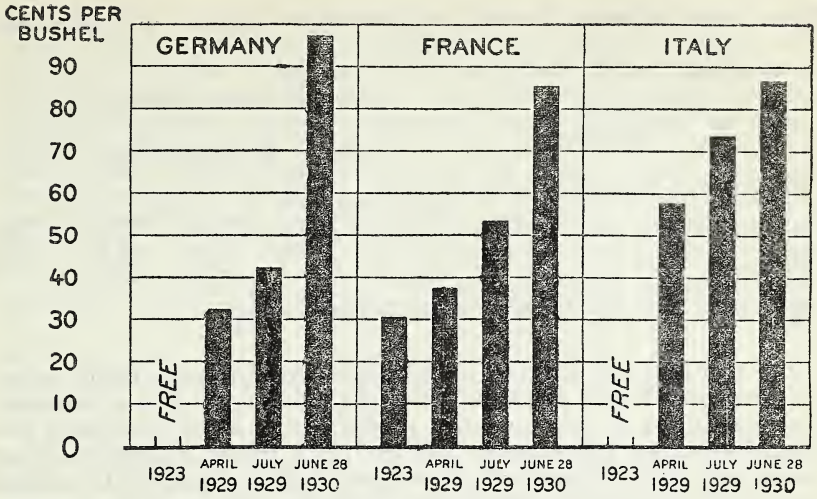

FIGURE 7.—IMPORT DUTIES ON WHEAT IN IMPORTANT IMPORTING COUNTRIES ON SPECIFIED DATES

Tariff duties have been greatly increased in the past 18 months. Since April, 1929, Italy has added 29 cents, France 52 cents, and Germany 65 cents per bushel on imported wheat. These increases in duties have been made by the respective Governments for the purpose of protecting their domestic markets from world competition at low prices, when they had large domestic supplies.

TABLE 4.—*Wheat import duties imposed by foreign countries, June, 1930* [1]

Country	Duty in United States currency [2]	Country	Duty in United States currency [2]
	Cents per bushel		*Cents per bushel*
Austria	11.03	Japan	[6] 33.62
Belgium	[3] Free.	Mexico	64.45
Canada:		Netherlands	Free.
General (from United States)	42.00	Norway	Free.
Preferential (British Empire)	Free.	Poland	[7] 33.59
Czechoslovakia:		Portugal	([8])
Maximum	48.34	Spain:	
Minimum [4]	24.17	First tariff	220.61
Denmark	Free.	Second tariff	[9] 73.537
France	85.35	Sweden	26.99
Germany	97.24	Switzerland	105.05
Greece: Conventional rate	[5] 22.59	United Kingdom	Free.
Italy	86.67		

[1] Bushels of 60 pounds.
[2] Foreign currency converted at par rate of exchange except as otherwise stated.
[3] Import license required.
[4] Imports from the United States enjoy minimum rate, which is extended to countries having a most-favored-nation treaty with Czechoslovakia.
[5] Duty stated in metallic drachmas, but payable in stabilized paper drachmas at the ratio of 15 paper drachmas to 1 metallic drachma. In addition to the duty, there are surtaxes amounting to three-fourths of basic duty, payable at the same ratio.
[6] Conversion to United States currency made on the basis of the rate of exchange prevailing on June 30, 1930.
[7] Free of duty under special permit.
[8] Wheat may be imported only by authority of special decrees, which also fix the rates of duty.
[9] Applies to imports from the United States. Surtax on wheat 7 gold pesetas per 100 kilos (equivalent to 36.77 cents per bushel.) Duties are paid one fourth in gold and the remainder in silver or bank notes plus gold surtax varying periodically.

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TABLE 5.—*Import duties on wheat levied by France, Germany, and Italy on specified dates* [1]

Country	Duty per bushel in United States currency			
	1923	April, 1929	July, 1929	June 28, 1930
	Cents	*Cents*	*Cents*	*Cents*
Italy	(2)	57.78	73.54	86.67
France	30.52	37.44	53.34	85.35
Germany	(2)	32.41	42.14	97.24

[1] These dates do not indicate the date on which the duty became effective.
[2] Free.

The trend of the demand for wheat in the European deficit countries depends in part upon the trend of production in those countries. War conditions greatly curtailed production in some important producing countries, particularly France. The return of men from the armies and the reimposition of protective duties resulted in a rapid recovery in production immediately following the war. The acreage of wheat in Europe outside of Russia increased rapidly from 1921 to 1927. (Fig. 8.) Italy undertook to accomplish more than merely the recovering of pre-war acreage, and engaged in an intensive campaign for increasing production to meet domestic requirements.

Taking all of the European countries outside of Russia together, however, there has been no material progress in acreage expansion since 1927. The reduction in 1929 should not be taken as an indication of the beginning of a downward trend, for this reduction was probably due to heavier-than-usual winterkilling. The 1930 acreage is likely to be greater than that of 1929. It does not appear, however, that the demand of European deficit countries for wheat from the surplus producing countries is likely to be affected materially in the future by further expansions of acreage in Europe outside of Russia. The protective policy, however, is likely to be continued in most of the continental European countries, thus maintaining wheat production above what it otherwise would be and, by maintaining higher local prices, holding in check to some extent the world's demand for wheat.

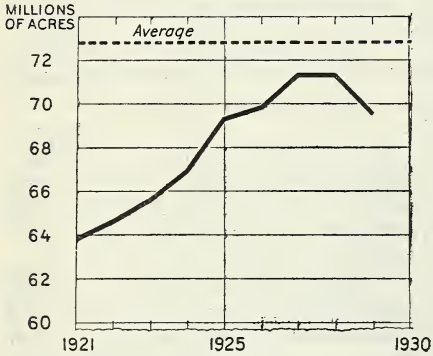

FIGURE 8.—ESTIMATED WHEAT ACREAGE FOR EUROPE (EXCLUDING RUSSIA), AVERAGE, 1909–1913, AND 1921 TO JULY, 1930

European wheat acreage outside of Russia has not yet recovered to the pre-war level. Areas have declined or remain below pre-war levels in the United Kingdom, France, and Rumania. In other countries, particularly Spain, Italy, Yugoslavia, and Hungary, the wheat areas have increased but not sufficiently to make up for the smaller areas in other countries. On the whole, no material expansion in wheat acreage is to be expected outside of Russia.

The demand for wheat in the United States is increasing, but very slowly. The effect of the growth of population upon demand during the past 30 years has been offset to a considerable extent by a reduction in per capita consumption. Thirty years ago it required about

5.4 bushels of wheat to make the per capita flour consumption in the United States. This has been reduced to 4.2 bushels, a decline of 1.2 bushels per capita. The significance of this becomes evident when it is observed that a reduction of 1.2 bushels per capita for about 123,000,000 persons means a reduction of nearly 148,000,000 bushels in the requirements of the United States. If every person in the United States were consuming to-day the same amount of flour or foodstuffs prepared from wheat flour as 30 years ago, the average exports from the United States in the past five years would have been reduced from 154,000,000 to about 10,000,000 bushels.

The reduction in per capita consumption in the United States is the result of marked changes in the dietary habits of the people. Fruits, vegetables, dairy products, and sugar appear to have become relatively more important than breadstuffs, thus reducing the per capita demand for wheat products. Similar tendencies are to be observed in some other countries.

Reduction in the per capita consumption of wheat, of course, will not continue indefinitely, and the effect of such reductions is likely to continue to be more than offset by growth in population and by increasing per capita consumption in countries where the people are not now large consumers of wheat. But the growth of population is being checked in some countries and the growth in the demand for wheat foodstuffs is being impeded in other countries by low purchasing power and restrictive measures. The world's demand for wheat may not, therefore, increase as rapidly during the next 10 years as it has in the past 10 years.

THE TREND OF WORLD WHEAT PRODUCTION

The oversupply of wheat in the past few years has resulted from an accumulation of surpluses in a short period with a marked upward trend in wheat production. The world's production of wheat outside of Russia and China has increased at the rate of about 72,000,000 bushels per year since 1920. In part, this marked upward trend has been a recovery from war contraction, but in large part it has been also a continuation of a pre-war upward trend in production. In the period 1890–1914 world production, including Russia, increased at the rate of about 74,000,000 bushels per year. (Fig. 9.) Referring again to the course of prices since the Civil War, it will be observed that the pre-war expansion was accompanied by rising prices, whereas the post-war expansion has developed in the face of a declining price level. In judging whether or not this marked upward trend in production is likely to continue, it will be necessary to examine the factors influencing production and their probable effects upon production in the future.

Thirty years ago an eminent British scientist, Sir William Crookes, predicted that unless yields per acre were increased, the world would have a shortage of wheat by 1931, even if all the potentially available wheat land were put into use. Now we have a huge surplus of wheat and it is evident that this scientist did not foresee the possibilities of world wheat production. The British scientist had observed that wheat production in the United States had increased at a very rapid rate for many years after the Civil War. Finally this expansion

in the United States had halted and exports had begun to decline. Prices which had been falling for many years had begun to rise. He recognized that there was still some land in the world that could be brought under wheat cultivation, but believed that the world's wheat area could be increased by only about 100,000,000 acres.

With reference to the United States Sir William Crookes said:

> Practically, there remains no uncultivated prairie land in the United States suitable for wheat growing. The virgin land has been rapidly absorbed, until at present there is no land left for wheat without reducing the area for maize, hay, and other necessary crops. It is almost certain that within a generation the ever increasing population of the United States will consume all the wheat grown within its borders, and will be driven to import, and like ourselves, will scramble for a lion's share of the wheat crop of the world.

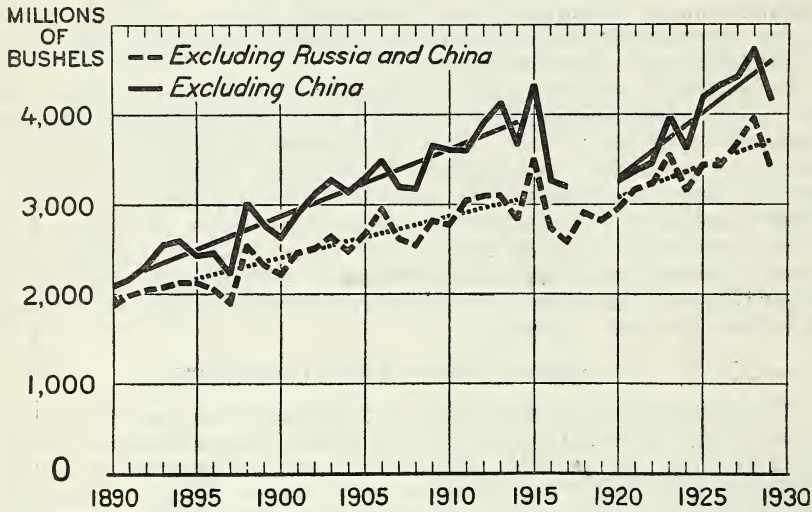

FIGURE 9.—WORLD PRODUCTION OF WHEAT, EXCLUDING CHINA, AND WORLD PRODUCTION, EXCLUDING RUSSIA AND CHINA, 1890 TO JULY, 1930

Thirty years ago it was predicted that the world would be short of wheat in 1931, but production has increased nearly 60 per cent in these 30 years. The increase during the early part of the past 10 years was largely due to recovery of production in Europe incident to the post-war reconstruction, but in the past 5 years it has been due largely to rapid increases in the production of exporting countries.

Time has proved him in error in his forecasts of both production and consumption in the United States. The greatest mistake of this eminent scientist was in not foreseeing the contributions of science to wheat production.

Thirty years ago the average wheat yield in countries for which statistics were available was estimated to be 12.7 bushels per acre. In the past seven years it has averaged 14.1 bushels, an increase of 1.4 bushels per acre. This increase in yield makes an important difference in world total wheat production. On last year's wheat area, outside of Russia, of 320,000,000 acres it makes a difference of 448,000,000 bushels.

Science has contributed largely to increasing yields per acre. Scientists have hunted the world over for varieties of wheat that would produce the highest yields under the most unfavorable conditions. Wheats have been selected and bred to produce higher yields in areas of low precipitation. Cultural practices have been

improved to the same end of increasing yields per acre. These contributions have not only succeeded in increasing yields per acre on lands that had been under cultivation for many years, but they have also made it possible to expand production into regions with short-growing seasons and areas of low rainfall, far beyond what was possible 30 years ago.

Inventors and engineers have also contributed greatly to the expansion in world wheat production. The inventors and manufacturers of the reaper and self-binder contributed greatly to the expansion of production in the United States following the Civil War. In recent years the tractor and the combine have become an important factor in expanding wheat production.

Argentina, Australia, and Canada have contributed largely to the upward trend in wheat production during the past 40 years. (Fig. 10.)

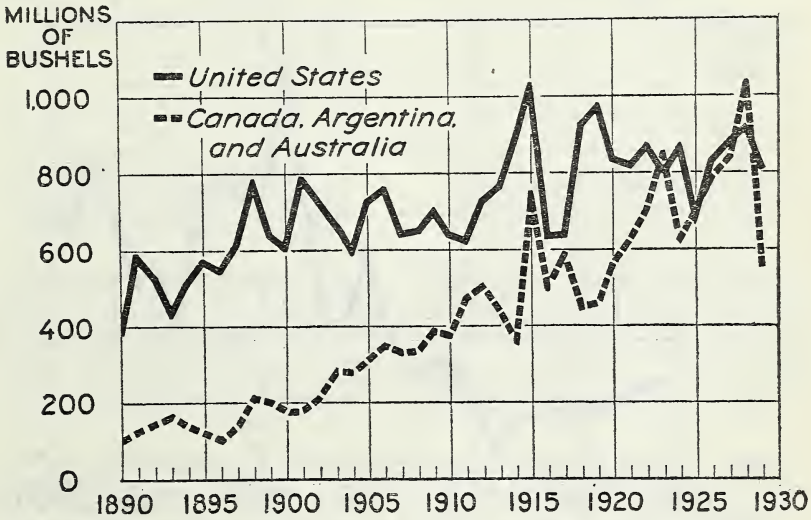

FIGURE 10.—WHEAT PRODUCTION IN THE UNITED STATES AND IN CANADA, ARGENTINA, AND AUSTRALIA COMBINED, 1890 TO JULY, 1930

For the past 40 years wheat production in Argentina, Canada, and Australia has increased much more rapidly than production in the United States. In the five years, 1890 to 1894, these countries together produced less than one-third as much as the United States, while in the five years, 1925 to 1929, their crop amounted to 95 per cent of that of the United States. In the past five years the exports from these countries (Canada, Argentina, and Australia) have averaged 557,000,000 bushels, while the average exports from the United States were only 192,000,000 bushels.

From small-producing countries they have rapidly come to the front as large producers and exporters. During and following the World War production in these countries expanded sufficiently to make up for the loss in exports from Russia. Science and machinery are contributing to the expansion of production in foreign countries as well as in the United States.

THE TREND OF WHEAT ACREAGE

Expansion of acreage in new wheat-producing areas is the dominant factor in the upward trend in world wheat production. It has been observed that the increase in yields during the past 30 years would have added 448,000,000 bushels to a crop on 320,000,000 acres. In the same period, however, the world wheat area had been increased

by more than 100,000,000 acres which, with a yield of 14.1 bushels, is the equivalent of over 1,400,000,000 bushels. In 1929 the world wheat area outside of Russia and China amounted to 245,000,000 acres, compared with an average of 204,000,000 in the period 1909–1913. Of this increase of over 40,000,000 acres, the United States contributed 14,000,000, Canada 15,000,000, Australia 7,000,000, and Argentina 3,000,000 acres, respectively. Since producers have a more complete control over the wheat acreage seeded than over any other factor in the world wheat situation, the trends of wheat acreage in the United States and important competing countries will be presented in detail.

The area seeded to wheat in the United States increased very rapidly from the low point of about 44,000,000 acres in 1909 to a high point of nearly 76,000,000 acres in 1919. (Fig. 11.) It will be observed

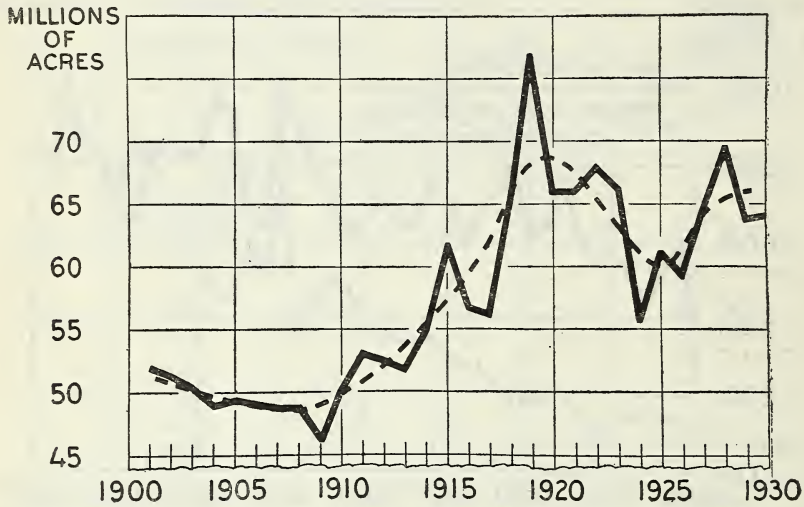

FIGURE 11.—UNITED STATES WHEAT ACREAGE (WINTER WHEAT SEEDED PRECEDING FALL AND SPRING WHEAT), 1901 TO JULY, 1930

The area of wheat seeded in the United States began to expand rapidly in 1910 and continued through the war. Following the war acreage declined until in 1924. Higher wheat prices in 1924 and 1925 gave a new impetus to wheat production, resulting in a marked expansion in area through the years 1924 to 1928. The expansion of area in the period 1910 to 1914, like that of 1924 to 1928, was in the face of declining prices. In both cases expansion was due to the development of new areas and improved methods of production.

that the expansion began before the war. This was largely the result of developing new wheat lands upon the Great Plains. War prices stimulated expansion in acreage both in old and new wheat-producing territory. East and West, North and South sowed more wheat.

The marked decline in prices following the war eliminated many acres. By 1924 the area had been reduced nearly to the level of 1914. Higher prices on account of a reduction in the world crop in 1924, followed by another season of relatively high prices, gave an impetus to expansion in area which was continued to 1928. Since 1926 the expansion of the area and its maintenance upon a high level has been in the face of declining prices.

In considering the probable future of wheat acreage in the United States it is necessary to examine the trend of acreage in different parts of the country.

The acreage of wheat east of the Mississippi increased to meet war demands and then promptly shrunk below pre-war levels. (Fig. 12.) In practically all States east of the Mississippi wheat has become a minor crop except in localized areas where it can be grown advantageously in rotation with other crops.

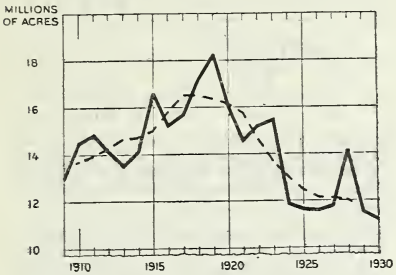

FIGURE 12.—WHEAT ACREAGE IN STATES EAST OF THE MISSISSIPPI RIVER (WINTER WHEAT SEEDED PRECEDING FALL AND SPRING WHEAT), 1909 TO JULY, 1930

The wheat acreage east of the Mississippi has been reduced rapidly since the war. From the high point of 18,000,000 acres in 1919 the area has been reduced to about 11,000,000, which is even lower than the pre-war acreage. Conditions generally seem favorable for continuing a reduction in acreage east of the Mississippi, but it is hardly likely that reduction from the present level will proceed as rapidly as from 1919 to 1925.

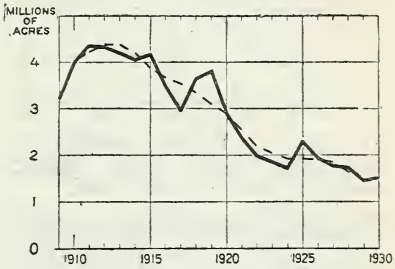

FIGURE 13.—WHEAT ACREAGE IN MINNESOTA (WINTER WHEAT SEEDED PRECEDING FALL AND SPRING WHEAT), 1909 TO JULY, 1930

Feed crops and pastures for dairy cows have been displacing wheat acreage in Minnesota. In fact, the return to war-time high prices practically had no effect upon the acreage in that State except that it may have retarded the decline until after the war. In the past 10 years the acreage of this State has been reduced 50 per cent. Similar changes have been taking place in the eastern sections of the Dakotas, but not in the western areas of the Dakotas or Montana.

Acreage has been decreasing in the eastern half of the spring-wheat area but increasing in the western half. Minnesota, which before the war was a great wheat producer, has curtailed acreage to a low level. Dairying, with feed grain crops, has taken the place of wheat in that State. (Fig. 13.) A similar change is taking place in the eastern half of the Dakotas but expansion continues in the western half of these States.

EXPANSION OF ACREAGE INTO NEW TERRITORY

The trend of wheat acreage in Montana shows what adapted seed and improved cultural practices, together with machinery, can do in the way of expanding acreage in new agricultural areas. (Fig. 14.)

In the far Northwestern States, Idaho, Washington, and Oregon, the wheat acreage has been maintained on a fairly high level. The trend of acreage in these States has also been upward since 1924. The crop alternatives in these States are limited. Undoubtedly the wheat area can be expanded further but lower prices may check its expansion. (Fig. 15.)

The southwestern hard-winter-wheat States have contributed more than any other group of States to increaing the wheat area of the United States. The expansion in this area since 1924 has much more than offset reductions in the soft red winter wheat and eastern spring

wheat producing States. Here, as in Montana, improved seed and improved cultural practices, together with the tractor and the combine, have carried production far beyond its pre-war limits. (Fig. 16.)

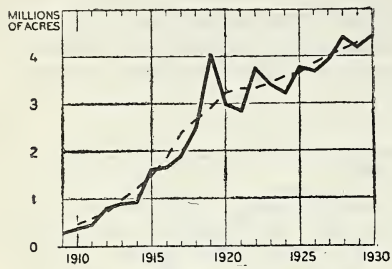

FIGURE 14.—WHEAT ACREAGE IN MONTANA (WINTER WHEAT SEEDED PRECEDING FALL AND SPRING WHEAT), 1909 TO JULY, 1930

Wheat acreage has expanded rapidly since 1921. In recent years that expansion has taken place in the face of falling prices. Expansion in this State is in line with that of the southwestern winter-wheat-producing region and the Canadian Province of Alberta to the north. Montana reduced acreage in 1930.

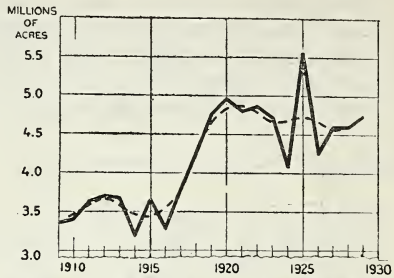

FIGURE 15.—WHEAT ACREAGE OF IDAHO, WASHINGTON, AND OREGON (WINTER WHEAT SEEDED PRECEDING FALL AND SPRING WHEAT), 1909 TO JULY, 1930

During the war period the acreage in the far Northwestern States was greatly increased. The post-war decline in prices resulted in a decline in the wheat area until in 1924. Since that year the trend of production has been upward. The high acreage in 1925 is in part a duplication by seeding spring wheat on a large area of abandoned winter seedings.

Reviewing this region State by State, it will be observed that all of the States have contributed to the increase in acreage. (Figs. 17, 18, 19, 20, and 21.) The most marked upward trends are to be observed in Texas and Kansas. Oklahoma and Colorado are holding acreage

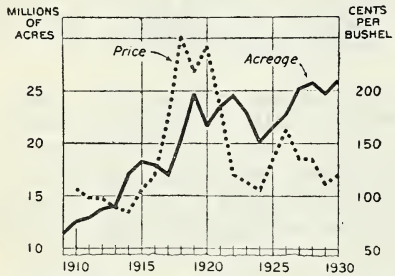

FIGURE 16.—WHEAT ACREAGE IN THE SOUTHWEST WINTER WHEAT STATES, NEBRASKA, KANSAS, COLORADO, TEXAS, AND OKLAHOMA (WINTER WHEAT SEEDED PRECEDING FALL AND SPRING WHEAT), AND PRICES OF NO. 2 HARD WINTER WHEAT AT KANSAS CITY, 1909 TO JULY, 1930

The southwestern hard winter wheat States have increased seedings by about 5,000,000 acres in the past six years. A large part of this increase has been made in the face of falling prices. The expansion from 1914 to 1919 was largely due to rising prices. The depression of 1920–21 led to some reduction in acreage. The higher prices of 1924–25 started the expansion and the combine and the tractor tended to keep it going while prices fell.

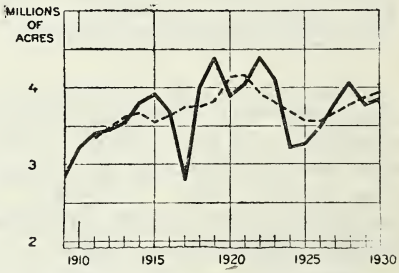

FIGURE 17.—WHEAT ACREAGE OF NEBRASKA (WINTER WHEAT SEEDED PRECEDING FALL AND SPRING WHEAT), 1909 TO JULY, 1930

Nebraska acreage responded to the 1924–25 prices and machinery kept it going. From the low point of 1924, about a million and a half acres were added in four years. Is the lower acreage of the past two years an indication that the upward trend has come to an end? The increase in seedings last fall over those of the previous season indicates some doubt about it.

near to the high point of 1919. Nebraska lost some area after the World War but is recovering. Lands are still available for new breaking in all these States and the upward trend in the past few

years in the face of falling prices suggests the possibility of the area continuing to expand unless the producers conclude that, in the face of the possibility of prices falling still farther, it may not pay to continue to add to the surplus.

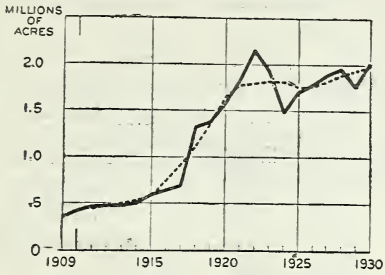

FIGURE 18.—WHEAT ACREAGE IN COLORADO (WINTER WHEAT SEEDED PRECEDING FALL AND SPRING WHEAT), 1909 TO JULY, 1930

Apparently war demands contributed to the marked increase in acreage in Colorado. Finding it possible to grow more wheat the area was held at a high level. Here we find an increase in the past six years similar to increases in the other important hard winter wheat producing States. The increase of about half a million acres is not large in itself, but relatively it is a big increase of about 33 per cent in six years.

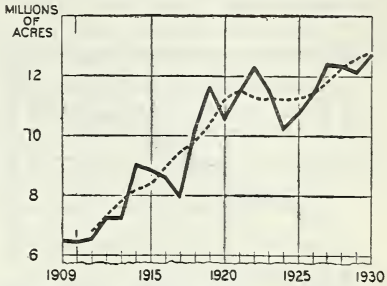

FIGURE 19.—WHEAT ACREAGE IN KANSAS (WINTER WHEAT SEEDED PRECEDING FALL AND SPRING WHEAT), 1909 TO JULY, 1930

In Kansas there has been an almost continuous upward trend in wheat acreage since 1911. The depression of 1920–21 had only a small effect in the Kansas acreage. Low prices in 1923, together with unfavorable planting conditions, had more effect, but in recent years expansion in acreage has continued the pre-war trend.

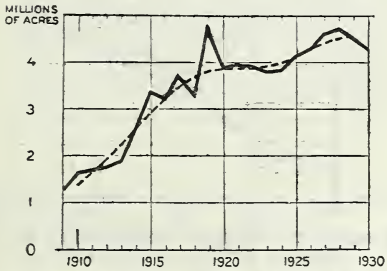

FIGURE 20.—WINTER WHEAT ACREAGE IN OKLAHOMA (SEEDED PRECEDING FALL), 1909 TO JULY, 1930

The acreage of wheat in Oklahoma has increased about one-fourth from 1924 to 1928. The war-time expansion is being held. Does the decline in the past two years indicate that the high point of acreage has been reached? Will cotton take an increasing proportion of the new lands?

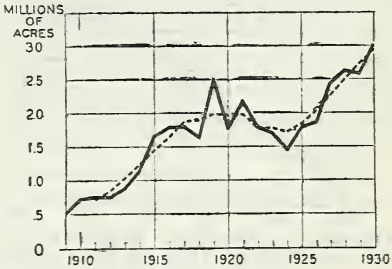

FIGURE 21.—WHEAT ACREAGE IN TEXAS (WINTER WHEAT SEEDED PRECEDING FALL AND SPRING WHEAT), 1909 TO JULY, 1930

The wheat acreage of Texas has doubled in the past six years, adding a million and a half acres. Expansion has continued at a rapid rate since 1926 in spite of the falling prices. There is here no indication of approaching a limit.

The trend of acreage in Canada has been continuously upward, with a slight recession following 1921. (Fig. 22.) In Canada, as in the United States, reductions have taken place in the older wheat-producing Provinces while new land was being broken in the western Provinces. (Figs. 23–25.) Following the war the area of Manitoba and Provinces farther east was reduced below pre-war levels. In Saskatchewan, on the other hand, expansion was only checked in

1921, to be resumed after 1925. In Alberta the wheat acreage has expanded continously from 1910 to date with only occasional setbacks for very short periods. There is still room for much new wheat acreage in both Saskatchewan and Alberta, as the line of wheat production is pushed northward and grazing lands within the interior are broken up.

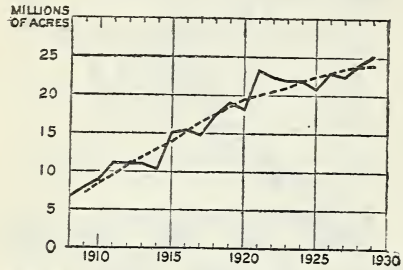

FIGURE 22.—WHEAT ACREAGE IN CANADA, 1908 TO JULY, 1930

War prices stimulated a very rapid expansion in Canadian acreage. Low prices in 1921 checked the expansion for a few years but, as in the United States, higher prices in 1924-25 caused the upward trend to be resumed. A large acreage has been maintained in recent years in the face of falling prices.

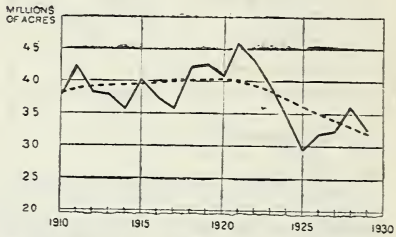

FIGURE 23.—WHEAT ACREAGE IN MANITOBA AND EASTERN PROVINCES, 1910 TO JULY, 1930

In Canada, as in the United States, the older producing areas are contracting while the newer producing areas are expanding. The higher prices of 1924-25 resulted in some increase in the area of Manitoba and the eastern Provinces but this increase has not recovered the pre-war level.

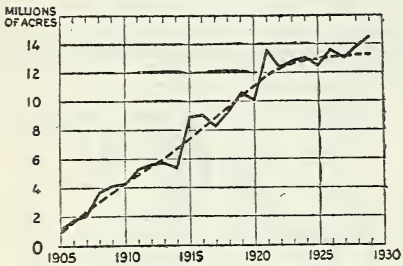

FIGURE 24.—WHEAT ACREAGE IN SASKATCHEWAN, 1905 TO JULY, 1930

Wheat acreage continues to expand in Saskatchewan. But this Province is becoming old wheat-producing territory and the rate of expansion of recent years has been only moderate in comparison with the expansion that has taken place in many of the newer wheat-producing regions. Doubtless there is still some room for expansion in Saskatchewan.

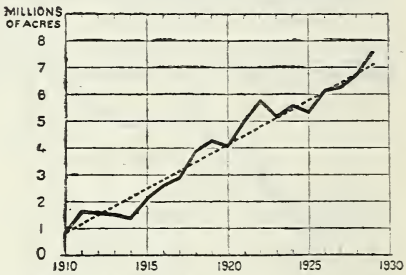

FIGURE 25.—WHEAT ACREAGE IN ALBERTA, 1910 TO JULY, 1930

Alberta has continued to expand wheat acreage at a rapid rate since 1910, through the war period, and to date. Beginning with only a million acres, that Province last year had 7,500,000 acres. In the past five years the increase in the wheat area of this Province alone has been more than 2,000,000 acres, about half as much as in the southwestern hard winter wheat States. There is still room for a lot of new wheat acreage in Alberta.

Australia has contributed largely to the increase in the world's production since 1920. (Fig. 26.) The harvested wheat acreage in Australia increased from a little over 6,000,000 acres in 1919 to 15,000,000 in 1928. In Australia, as in the Great Plains area of the United States and in western Canada, moisture is a limiting factor in the expansion of area, but improvements in culture have made it possible to develop new areas. The greatest increase in production in recent years has been in Western Australia. Reports now indicate that the area seeded for 1930 is greater than in any previous year. The increase in 1930 is attributable in part to low incomes

from the sheep industry and a tendency to shift from that industry to wheat.

Wheat acreage in Argentina expanded at a fairly rapid rate from 1904 to 1917. After a post-war reduction, the expansion was resumed at a rapid rate from 1921 to 1928. (Fig. 27.) In 1928 Argentina harvested a record wheat crop and contributed more than any one single country to the depression in prices in the first half of the 1929–30 marketing season. The 1929 reduction in acreage was due to weather conditions more than to the intentions of producers. The small 1929 crop sold at low prices may check expansion for a short time, but there is still room in Argentina for a larger wheat acreage. The rate of expansion in the next few years is likely to depend in part upon the profitableness of producing corn and cattle. The

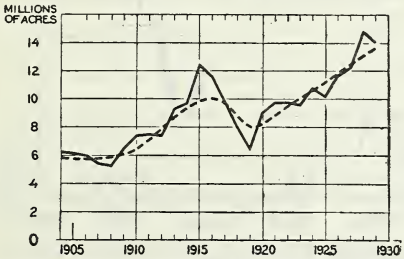

FIGURE 26.—WHEAT ACREAGE IN AUSTRALIA, 1904 TO JULY, 1930

In Australia as in Argentina acreage has expanded rapidly in the past six years. In this period Australia has added about as many acres as the southwestern hard winter wheat States have added. In Australia, as on the Great Plains, moisture is the important factor in limiting the areas available for wheat production; but there, as here, the combine and the tractor are aiding in the expansion.

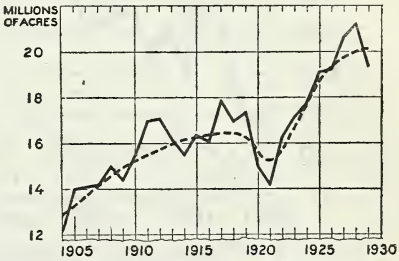

FIGURE 27.—WHEAT ACREAGE IN ARGENTINA, 1904 TO JULY, 1930

Argentina is also using the combine and the tractor on new lands to produce more wheat. In five years the United States has sold to that country 16,683 combines, and 24,382 tractors. A short crop in 1919, followed by low prices, reduced the Argentine acreage to a low level, but the comeback was quick. The reduction in the past year is not due to acreage so much as to weather. Another short crop and low prices may curtail Argentine acreage for a brief period, but there is still room in Argentina for considerable expansion.

development of new areas, however, is likely to maintain and possibly continue the expansion.

RUSSIA AS A FACTOR IN THE WORLD WHEAT SITUATION

Russia continues to be an uncertain factor in the world wheat situation. Just before the World War she was the leading wheat-exporting country of the world, exporting about 165,000,000 bushels a year, or nearly 57 per cent more than the United States at that time. During the war and the revolution Russian wheat exports practically ceased but began to show signs of revival in 1926, and in 1927 wheat exports amounted to 49,000,000 bushels. During the last three years Russian wheat exports have again become insignificant and during the season 1928–29 Russia was actually on an import basis. (Figs. 28, 29.)

A loss of territory after the war cut Russian total wheat production but had little effect on the surplus for export as the territory lost, if taken as an unit, was scarcely self sufficient. Wheat production in the present Russian area is somewhat above the pre-war production in the same area. (Table 6.)

The real reason for the decrease in Russian grain exports is not decreased production, but rapid expansion in Russian wheat consumption. This large increase in consumption is due to the rapidly

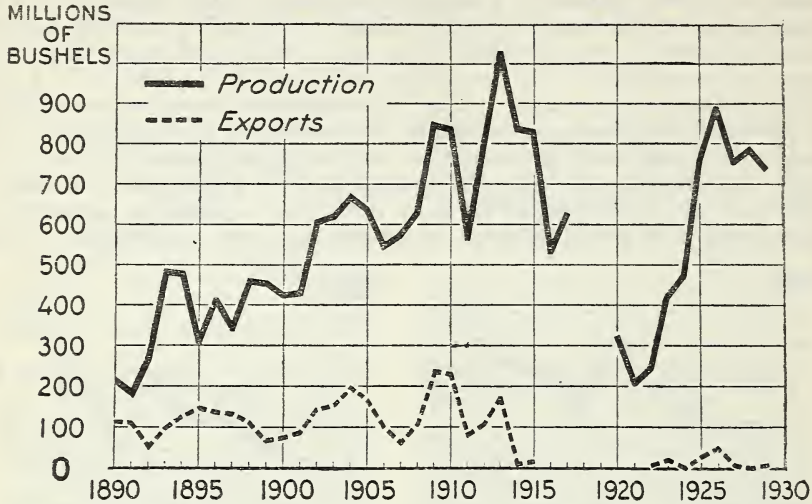

FIGURE 28.—RUSSIAN WHEAT PRODUCTION AND EXPORTS, INCLUDING FLOUR IN TERMS OF WHEAT, 1890 TO JULY, 1930

Before the World War Russia was not only one of the largest wheat producers in the world but was often the largest exporter. In the five years preceding the war Russian net exports averaged nearly 165,000,000 bushels compared with 105,000,000 exported from the United States. The Russian population has increased and the peasants are eating more of their wheat. The Soviet Government, however, is making especial efforts to produce more wheat for export.

increasing population and also to an increase per capita consumption of wheat, with a shift from rye to wheat foods.

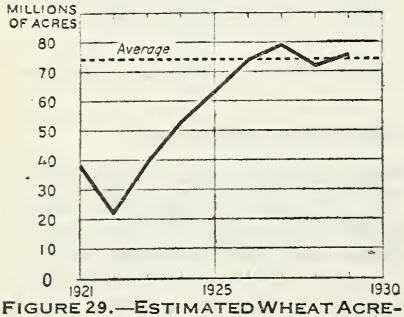

FIGURE 29.—ESTIMATED WHEAT ACREAGE FOR RUSSIA, AVERAGE, 1909–1913, AND 1921 TO JULY, 1930

Russia is an old wheat producer now trying new methods. The revolution greatly curtailed wheat acreage. By 1926 the pre-war area appears to have been recovered. Now the Government is planning a considerable increase in wheat production. In the past five years the United States has shipped about 39,000 tractors and about 500 combines to Russia. Undoubtedly the Russian wheat area can be increased to a large extent.

Some of the factors which have tended to prevent expansion of Russian wheat production after the revolution were the break-up of the large private holdings which formerly produced most of the surplus wheat, and the establishment of the many additional small peasant farms. The well known repressive policy adopted by the Soviet Government toward the rich peasants has discouraged surplus production and tended to make peasant farming more and more self-sufficient by destroying the incentive for profit from surplus production.

To offset these conditions, the Soviet Government has carried on an intensive campaign for the collectivization of Russian peasant agriculture which included 4 per cent of the peasant households in 1929 and over 50 per cent on March 1, 1930. This collectivization was expanded so rapidly that proper organization could not be devel-

oped to keep up with the movement. The sowing campaign was actually endangered in the spring of 1930 and there were numerous recessions of peasants from the collective farms.

The prospects of Russia's becoming a competitor in the world wheat market in the next decade will depend largely upon the success of the agricultural policy of the Soviet Government, its ability to build up an efficient farm and marketing organization of its own pattern, to provide adequate economic stimuli, as well as an improvement in technic, and the application of scientific methods to the abundant natural resources existing for commercial wheat production.

TABLE 6.—*Acreage and production of grain crops in Russia, average 1909–1913, annual 1925–1929*

ACREAGE

Year	Wheat	Rye	Barley	Oats	Corn
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*
Average, 1909–1913 [1]	74,209	61,055	26,193	41,256	3,246
1925	63,119	72,114	15,661	33,284	8,147
1926	73,897	71,066	17,897	39,613	7,134
1927	78,961	70,043	17,144	45,116	6,733
1928	71,879	64,412	17,653	42,625	11,194
1929	75,721	64,392	19,958	46,452	8,784

PRODUCTION

	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Average, 1909–1913 [1]	758,941	735,505	418,030	924,918	52,185
1925	782,266	906,248	268,686	838,437	172,038
1926	913,807	941,285	245,721	1,070,809	131,489
1927	776,019	961,363	206,681	916,976	136,606
1928	793,289	752,713	252,151	1,135,369	130,701
1929	738,908	796,018	337,579	1,144,325	165,739

1925–1929, compiled from controlling figures for the national economy of the Union of Socialistic Soviet Republics for 1929–1930.

[1] Area within present boundaries.

The Soviet Union estimates that the population of that country will be increased 12 per cent from 1928 to 1933. They propose to increase the production of farm crops by 58 per cent, and increase the grain crop 50 per cent. Modernization of agriculture, they say, will result in a 35 per cent increase in the yield per acre by 1933.

In the past five years the United States has shipped nearly 39,000 tractors and 500 combines to Russia. In the meantime factories are being built to produce machinery. The peasants are being collected together so that their production activities can be controlled and their output increased by the use of machinery cooperatively or collectively.

THE TRACTOR IN WHEAT PRODUCTION

Probably the most important single factor in expanding production in new areas after 1925 has been the increase in the use of the tractor and the combine in preparing the soil for harvesting the wheat crop in the United States and elsewhere.

During the first decade of the twentieth century the gasoline tractor was going through a development period and was used by farmers only to a limited extent. The first gasoline tractors were used principally for plowing and disking; they were most common

in the Wheat Belt. The first tractors tended to be of rather large size since they were used chiefly for heavy work. General-purpose tractors designed for cultivating, as well as for plowing and other light-draft operations, came into limited use about 1915. Since 1920, the development of the general-purpose tractor has been rapid.

In 1917 about 60,000 tractors were manufactured in the United States which was an increase of about 100 per cent as compared with the turnout of the previous year. There were more than 850,000 tractors on farms in the United States in 1928. A considerable number of farms, largely located in the Wheat Belt, Corn Belt, and the Cotton Belt, are now entirely operated by motor power.

Most of the types of machines now in use on farms in the United States were well established before the gasoline tractor assumed a rôle of importance. The extensive use of tractors during recent years has, however, resulted in large machinery coming into more general use. Many farmers have replaced 1-horse and 2-horse implements with large-size horse implements or with tractor-operated machines. For more than 30 years the duck-foot cultivator has been used to a limited extent, at least along the Pacific coast. Recently it has been successfully introduced in the Wheat Belt of the northern Great Plains where it has decreased the quantity of labor needed for summer fallowing and preparing land for small grains.

The United States has also contributed to the development of the use of tractors in foreign countries. (Table 7.)

TABLE 7.—*Exports of tractors from the United States to specified countries, 1925–1929*

Calendar year	Country to which exported					
	Russia in Europe	Canada	Argentina	Australia	Other countries	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
1925	6, 760	5, 368	4, 871	4, 179	24, 768	45, 946
1926	9, 703	8, 320	2, 433	4, 990	25, 796	51, 242
1927	5, 119	16, 218	3, 140	4, 408	29, 390	58, 275
1928	5, 083	21, 837	4, 982	5, 137	20, 826	57, 865
1929	12, 245	17, 078	8, 956	2, 353	19, 523	60, 155
Total	38, 910	68, 821	24, 302	21, 067	120, 303	273, 483

Tractor sales in prairie Provinces of Canada were reported in 1929 as 8,884, and in 1920, 10,279. The number sold dropped in 1921 to 3,428 but increased to 10,026 in 1927 and 17,143 in 1928, reaching a total of 70,826, sold in 10 years. In 1925 there were 6,000 farm tractors in Argentina according to Commerce Reports.

THE INCREASING USE OF COMBINE-HARVESTERS

Recently the combine has become an important factor in expanding wheat production on the Great Plains. H. R. Tolley in the bulletin of the Pan American Union, February, 1930, said:

The combined harvester-thresher, commonly called the combine, was used along the Pacific coast for some time prior to 1900. For years it was used exclusively in this district where weather conditions are especially favorable for combining the grain. At this time it was believed that the combine was unsuited for harvesting wheat in localities where rainfall is more or less frequent during the harvesting period. However, combines finally came into limited use in the

Great Plains area between 1915 and 1920, and since then they have increased rapidly and extensively and are now well established.

The first combine of the Pacific coast region was operated by large-sized teams, but the combines of the Great Plains region of to-day are usually either partially or completely operated by motor power. The combine has spread rapidly over the small grain-producing areas and, at present, is used to some extent in every important wheat-producing State. Kansas was reported to have had 8,274 combines in 1926; in 1928 this number had increased to about 20,000. At the present time it is estimated that one-third of the hard winter wheat, about one-fifth of the spring wheat, and a lesser amount of soft winter wheat is harvested with the combine.

The improvements in machinery have resulted in a great saving of labor. When wheat was harvested with a sickle and threshed with a flail, from 35 to 50 hours of labor were necessary for harvesting and threshing an acre of wheat with a yield of 15 bushels. The introduction of the cradle effected a saving of about 10 hours per acre. At present, farmers in the Great Plains usually use from four to five hours of labor for harvesting and threshing an acre of wheat when it is harvested with a binder and threshed from the shock with a stationary thresher; from three to four hours of labor when the crop is harvested with a header and threshed with a stationary thresher; and an average of three-fourths of an hour of labor when the combined harvester-thresher is used. Stated in another way, a combined harvester-thresher usually harvests and threshes wheat at a cost of from 3 to 5 cents a bushel while the cost of threshing alone, when the header or binder is used, usually amounts to more than 10 cents per bushel.

Some idea of the rapidity of the recent spread of the combine over this country may be gained from the total number sold in the United States, which in 1923 was 1,099; in 1926, 6,277; and in 1929, 19,666. Our foreign competitors are also using the combine. (Table 8.)

TABLE 8.—*Exports of combined harvesters and threshers from the United States to specified countries, 1925–1929*

Calendar year	Country to which exported					
	Russia in Europe	Canada	Argentina	Australia	Other countries	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
1925	21	110	619	----------	970	1,720
1926	4	368	3,637	97	338	4,444
1927	----------	819	3,097	261	528	4,705
1928	33	3,560	3,116	3	605	7,317
1929	435	3,013	6,214	37	1,372	11,071
Total	493	7,870	16,683	398	3,813	29,257

Combines were introduced into Canada in 1908 but scarcely used until after 1923. In 1924 there were four privately owned combines, by 1926, 174, by 1927, 598, by 1928, 3,657, and in 1929, 3,295. In 1929 Canada exported 2,472 reaper-threshers; to Argentina 966, Australia 362, and to the United States 1,029.

A small type of 1-unit combine, called a stripper-harvester, of domestic manufacture, is in general use in Australia. In 1927–28 Australia imported 451 combines from the United States and 820 from Canada.

It is estimated that 85 to 90 per cent of threshers sold in Argentina are of American manufacture. Imports of combines into Argentina in 1929 were reported at 3,116.

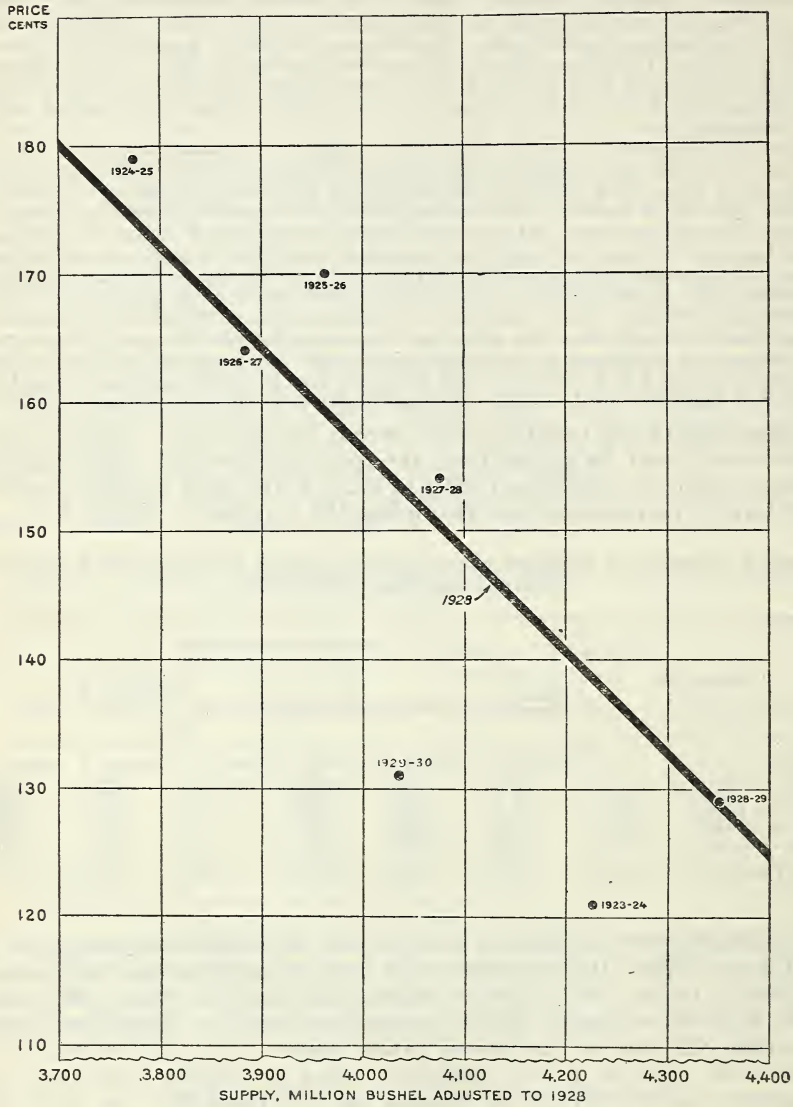

FIGURE 30.—THE WORLD WHEAT SUPPLY AND PRICES

World wheat prices are closely related to supply, when the general commodity price level remains about the same. A small world supply as in 1924 results in high prices in Liverpool, whereas a very large supply, as in 1928, results in low prices in Liverpool. According to this chart in the past few years a change of 100,000,000 bushels from the average supply would change the world market prices about 8 cents per bushel.

FACTORS AFFECTING THE PRICE OF WHEAT

World wide supply and demand conditions determine wheat prices in world markets. (Fig. 30.) A comparatively small world supply in 1924 resulted in prices averaging nearly $1.80 per bushel and a large world supply in 1928–29 resulted in prices averaging less than $1.30 per bushel. Leaving out of account the two seasons 1923–24 and 1929–30, when business depressions reduced prices below normal levels, it appears that on the average an increase of 100,000,000 bushels in the world supply will reduce prices in world markets about 8 cents per bushel, or a reduction of 100,000,000 bushels will increase prices about 8 cents per bushel.

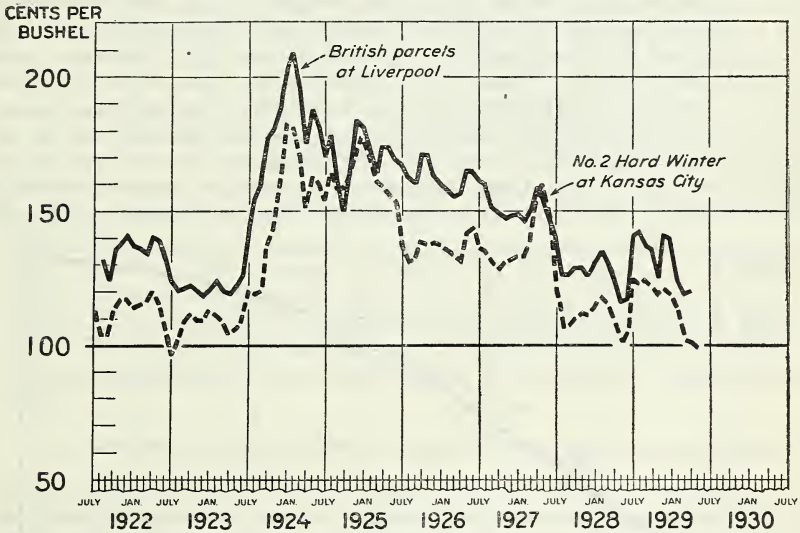

FIGURE 31.—PRICES OF BRITISH PARCELS OF WHEAT AT LIVERPOOL AND NO. 2 HARD WINTER WHEAT AT KANSAS CITY, JULY, 1922, TO JULY, 1930

Liverpool being a free market for large quantities of wheat from all parts of the world is in a real sense a world wheat market. Prices at Kansas City generally fluctuate with prices at Liverpool, but the spread between Kansas City and Liverpool prices is sometimes wide and sometimes very narrow. In fact, occasionally the price of No. 2 hard winter wheat at Kansas City is as high as, or a little above, the average at Liverpool.

RELATION OF PRICES IN THE UNITED STATES TO WORLD MARKETS

The price relations between world markets vary, however, depending upon variations in supply and demand conditions as they affect each of the markets separately. Taking Liverpool as a representative in the world market, it will be observed over a period of years that the course of prices of wheat in Kansas City follows in general that of prices in Liverpool. (Fig. 31.) The differences, however, are important. The relation in prices in Kansas City to the prices in Liverpool depend largely upon the amount of hard red winter wheat that is available for export. In years in which the hard winter wheat crop is large, Kansas City prices are far below Liverpool, but when the exportable surplus is small, as in 1925, the prices in Kansas City move up close to prices in Liverpool.

THE EFFECT OF CHANGES IN PRODUCTION UPON PRICES

In the past seven years the average production of wheat in the United States has been about 824,000,000 bushels annually. A reduction of 10 per cent in this amount would total slightly over 82,000,000 bushels. In a year when United States production is 824,000,000 bushels, farm prices would normally average about 40 cents below the average levels of parcels of wheat imported into the United Kingdom. A reduction of 10 per cent, or 82,000,000 bushels in the United States crop would normally be expected to result in a reduction of about 72,000,000 bushels in our exportable surplus. A reduction of 72,000,000 bushels in exports would improve the average of farm prices in the United States as compared with world prices to the extent of about 6½ cents per bushel, but this would not be the only effect of a reduction in the United States crop upon the prices in the United States. There would also be the effect upon the world level of prices, and judging from such evidence as we now have, a reduction of 82,000,000 bushels in the United States crop in any given year would tend to raise world prices about 6½ cents per bushel. Thus, the total effect upon the prices received by wheat growers of this country would amount to about 13 cents per bushel. (Fig. 30.)

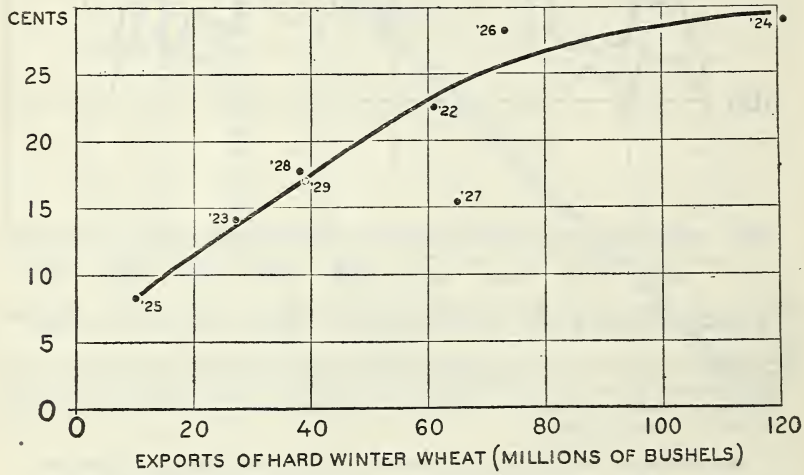

FIGURE 32.—THE PRICE SPREAD OF WHEAT BETWEEN KANSAS CITY AND THE UNITED KINGDOM, AND EXPORTS OF HARD WINTER WHEAT FROM THE UNITED STATES

When the exportable surplus of hard red winter wheat is large as in the 1924–25 season, Kansas City prices are far below Liverpool. When the exportable surplus is small, as in the 1925–26 season, Kansas City prices are close to those in Liverpool. The exports of hard red winter wheat in the past seven years have averaged about 60,000,000 bushels per year, with an average spread between Liverpool and Kansas City of about 23 cents.

If only the hard winter wheat growers were to reduce acreage by 10 per cent, the effect upon their prices would not be as great as though there were a similar reduction in the crop of all classes of wheat. However, a substantial effect would be had even if the cut in acreage were confined to the hard red winter wheat region. In the past seven years the production of hard red winter wheat of the United States has amounted to a little over 316,000,000 bushels yearly and at this level of production about 80,000,000 bushels are

normally exported as grain. A reduction of 10 per cent in its production would normally be expected to result in a decrease of exports of that class of wheat by about 28,000,000 bushels. Such a reduction in exports would improve the price of hard winter wheat at Kansas City as compared with the world price level by about 5.4 cents per bushel. The effect of the 32,000,000 bushel reduction in world production in a single year would normally amount to about 2½ cents per bushel. Hence, the total effect in any given year of a 10 per cent reduction in the acreage of hard red winter wheat from the average levels of the past seven years would probably improve Kansas City prices by nearly 8 cents per bushel. (Fig. 32.)

A reduction in the United States wheat crop with its tendency to raise world prices would also tend to increase the production of wheat in other countries as they would also benefit from the improved world price level. Just how far such an increase in the production of wheat in other countries would tend to counterbalance the effect of decreased production in the United States is impossible to say, but it is certain that the increase which might result in production of other countries from a decrease in the United States production would not altogether wipe out the direct effect which the decrease in United States production would have upon world prices. In the case of relationship between prices in the United States and world prices, there would be little or no tendency for any change as a result of long-continued reduction in the United States crop for the amount of change in this spread is calculated upon the relationship between exports and the spread and is largely dependent upon the length of time during the year that United States prices must be upon an export basis.

THE POSITION OF THE SOFT RED WINTER WHEAT PRODUCER

The prices that soft red winter wheat producers receive are not as closely related to world-market prices as are the prices that the hard red winter wheat producers receive for their wheat. In the past few years the soft red winter wheat crop has frequently been less than the usual domestic requirements for that class of wheat. It will be remembered that the acreage of wheat east of the Mississippi River has decreased sharply since the war. There has been a corresponding downward trend in the production of soft red winter wheat. (Fig. 33.) In some years practically no soft red winter wheat has been exported from the Eastern States, and only small shipments have been made from the far Northwest. Thus the reduction in acreage in the soft red winter wheat producing States has brought this wheat to a domestic market basis except in years when yields are relatively high, as in 1926.

The reduction of soft red winter wheat to a domestic market basis has resulted in soft red winter wheat prices being higher than hard red winter wheat prices in the same markets. (Table 9.) The small crops of 1924, 1925, 1927, and 1928 resulted in high prices for soft winter as compared with hard winter wheat of the same grade in St. Louis. (Fig. 34.) A good crop with an export surplus in 1926, on the other hand, placed the soft wheat at a discount in relation to the hard wheat in the same market. These changes appear to be independent of world market conditions. Nevertheless, the soft red

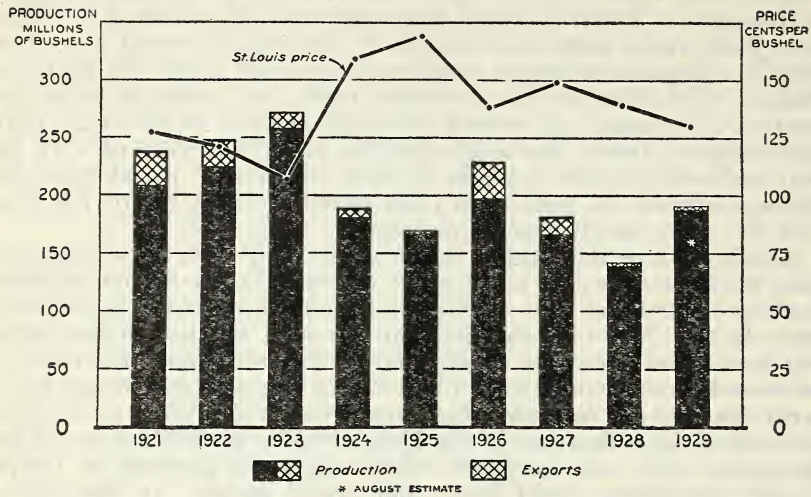

FIGURE 33.—PRODUCTION, EXPORTS, AND ST. LOUIS PRICE OF SOFT RED WINTER WHEAT, 1921–1929

The production of soft red winter wheat declined from 1923 to 1928, and prices held to a fairly high level, with a downward trend after 1925. Compare downward trend in production with acreage changes, Figure 12. The variation in exports is due in part to variations in production on the Pacific coast which in some years has furnished practically all the exports.

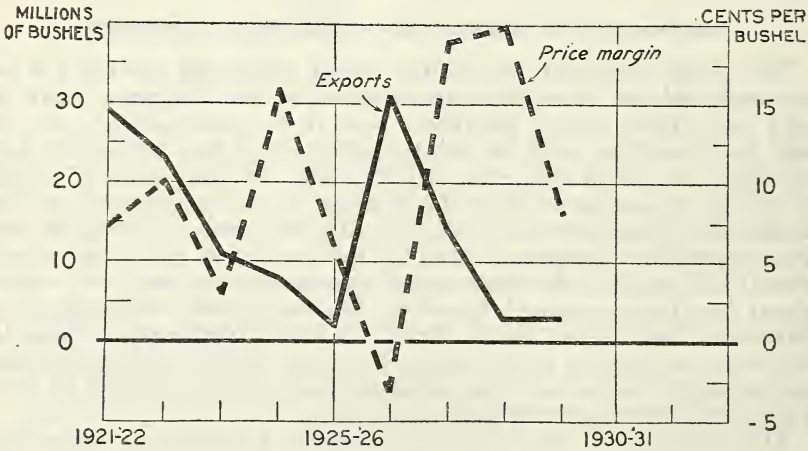

FIGURE 34.—TOTAL EXPORTS OF SOFT RED WINTER WHEAT AND PRICE MARGIN OF NO. 2 SOFT RED WINTER OVER NO. 2 HARD RED WINTER AT ST. LOUIS, 1921–1929

In years of short crops the soft red winter wheat production is sometimes scarcely sufficient to meet the usual domestic requirements, and prices of soft red winter rise above the prices of hard red winter wheat on the same market. In 1926 a large export surplus of soft red winter wheat resulted in the price of No. 2 red winter at St. Louis being below the price of No. 2 hard winter in the same market. This was followed by a shorter crop in 1927 and one still shorter in 1928 which reduced exports and raised the price of soft red winter far above hard red winter.

winter wheat prices are affected by prices in Kansas City and Liverpool. The level of prices in world markets determines limits beyond which soft red winter prices can not go. As the price of soft red winter wheat increases above hard winter, substitutions of white wheats and of the softer low-protein hard winter wheats begin to increase. Substitution checks the rise in soft red winter wheat prices. A continuation of high premiums over a series of years probably would result in a tendency to reduce the demand for soft red winter wheat by the substitution of flours produced from other wheats.

TABLE 9.—*United States wheat production, exports, and prices, by classes, 1923-24 to 1929-30*

PRODUCTION [1]

Year beginning July	Hard red spring	Durum	Hard red winter	Soft red winter	White	Total
	Million bushels	*Million bushels*	*Million bushels*	*Million bushels*	*Million bushels*	*Million bushels*
1923	127	55	241	272	102	797
1924	192	66	365	189	52	864
1925	156	65	206	170	80	677
1926	121	48	360	229	73	831
1927	202	83	317	181	95	878
1928	203	102	385	139	86	915
1929	140	56	344	188	78	806
1930 [2]	137	51	357	194	82	821

EXPORTS [3]

1923	2	19	27	11	20	79
1924	21	34	121	8	11	195
1925	5	27	10	2	19	63
1926	2	22	73	31	28	156
1927	6	31	65	14	30	146
1928	2	45	38	3	15	103
1929	2	12	57	3	18	92

PRICE [4]

	No. 1 Dark Northern Spring Minneapolis	No. 2 Amber Durum Minneapolis	No. 2 Hard Winter Kansas City	No. 2 Red Winter St. Louis
	Cents	*Cents*	*Cents*	*Cents*
1923	124	106	105	107
1924	158	156	135	159
1925	165	144	163	169
1926	151	155	135	138
1927	141	132	135	149
1928	126	113	112	139
1929	129	119	120	130

[1] Estimates of production by classes are based on surveys made in 1920, 1923, and 1924, of the percentage of different varieties of wheat grown, supplemented by investigations and judgment of cereal specialists. All estimates are the result of applying percentages for each State to the production of each State as estimated by the Division of Crop Estimates, save that durum estimates of four States are used directly. As there are changes from year to year in the relative amounts of the varieties of wheat grown and also changes in the relative yields per acre, these figures should be considered to be only rough approximations.

[2] Aug. 1 estimate.

[3] Total as reported by the Department of Commerce. Distribution by classes made on basis of United States inspections for export by ports and inspection of United States wheat in the eastern division of Canada.

[4] Compiled by Division of Statistical and Historical Research. Prices are average cash price per bushel weighted by car-lot sales.

ADJUSTMENTS IN THE HARD WINTER WHEAT AREA [2]

With increasing foreign competition and a prospect that the average price of wheat in world markets during the next 6 to 10 years will be lower than in the past 7, hard winter wheat growers must seriously consider the suitability of their farms, organization, and practices for profitable wheat production in the future.

As long as hard winter wheat is produced in excess of domestic requirements, that class of wheat will be very sensitive to world market conditions. In the past 7 years the exports of hard red winter wheat constituted nearly 23 per cent of our production of that type of wheat and 48 per cent of our total exports of unmilled wheat. Even at that, the exports in the past 2 years have not been sufficient to clear the domestic markets at the end of the season for the new crops. A material reduction in the supply of hard red winter wheat would not only raise the level of world wheat prices by its effect upon the total world supply, but it would also narrow the spread in prices between Kansas City and Liverpool, resulting in a substantial improvement in the relation between domestic and foreign market prices. Over a period of years, the initial increase in the world price of wheat resulting from a diminution in our exports probably would be offset in some degree by expansion in production and exports of other countries, but a large part of the improvement in domestic prices in relation to world market prices probably would remain.

Wheat growers in the hard winter wheat belt have faced the problem of producing wheat profitably in a period of increasing world competition and declining prices. Up to the present time many growers have been able to meet this situation by substantial reductions in costs secured through improved farm organization and production methods. The more important factors that have contributed to make this possible are: Rapid adoption of improved tractors, development of small combines, increased use of better adapted wheat varieties, better tillage methods which facilitate early preparation of the seed bed and moisture conservation, and an increase in the size of the usual wheat farm. Under the influence of these improvements, the wheat acreage has been materially expanded in the western portions of the hard winter wheat belt, during a period when agricultural prices have been settling to lower levels; and increased production there has been in turn a factor making for declines in wheat prices.

Where the land is well suited to wheat, improvements in production practices might well be more generally adopted. In the hard winter wheat belt, an increase in the size of many farms will facilitate the adoption of newer methods and equipment. In some parts of the hard winter wheat belt material increases have already been made in the size of family farms, and further increases seem probable and desirable. By such means acre costs can be lowered, yields increased, and bushel costs brought down.

Furthermore, in the western portions of the hard winter wheat belt experience and research have demonstrated the desirability of fallowing lands used for wheat—planting wheat on only a portion of the land each year. Under this method higher average yields and

[2] This statement was prepared by representatives of the agricultural colleges and experiment stations of Kansas, Nebraska, Colorado, Oklahoma, and Texas, the United States Department of Agriculture, and the Federal Farm Board.

higher protein content are ordinarily secured than where wheat is grown continuously. Better distribution of the use of labor and equipment is secured where fallowing is practiced. A smaller acreage is harvested to secure a given number of bushels of wheat, thus reducing harvesting costs per bushel. Where part of the land is fallowed each year, a diversity of seed-bed preparation methods is a necessary consequence. This gives greater stability to wheat production since no one method of preparing the seed bed is generally best year after year. This tends to reduce the risk of complete failure in any one year, thereby giving wheat production in the subhumid areas greater stability and lower costs. A material increase in the practice of fallowing is desirable.

In view of the changes in wheat production that seem inevitable during the next few years, material adjustments in the older wheat-producing areas are highly desirable. On many farms where wheat production has long been a more or less important farm enterprise, the new conditions demand at least a partial withdrawal. Here it is important to consider carefully the relation of the wheat enterprise to the other enterprises in the established systems of farming.

The problem of these changes at once raises the question of substitutes for wheat. The general tendency in these older wheat areas is to substitute hay and pasture crops such as sweetclover, alfalfa, and other legumes for a large part of the grain crop acreage. These crops serve the double purpose of soil improvement and feed for livestock. Any considerable acceleration of the rate at which this development is going on, however, exposes the farmers of these areas to the danger of expanding unduly their livestock enterprises, particularly in terms of beef and dairy production, and thus contributing to the periodic overexpansion of these industries.

There has been evidence of a tendency to increase land values in the newer wheat regions. In view of the outlook for wheat in the next few years, this tendency may result in distress if the land is overcapitalized. The past experience of regions in which farming has been relatively profitable is that the resultant higher incomes have been used too frequently in the higher capitalization of the land at the ultimate expense of the standards of living of the people on the land. Disaster has often followed declining prices when much of the increased income has been used to bid up land values. Excessive competition for the control of land has resulted in boom conditions in which land values rose to levels that could not be supported by its producing capacity. The consequences of such booms and their inevitable collapse are loss of farm homes, bank failures, and financially demoralized communities. These portions of the hard winter wheat belt where incomes have been relatively high in recent years must guard against the development of such conditions.

The use of part of the farm income in fortunate years to retire indebtedness, make improvements, or accumulate reserves that can be used to tide over adverse years is a wise policy. It is established business practice to set up reserves against emergencies. This principle applies to wheat production in the Great Plains area in particular, because of the variability in weather and other production conditions. Under these conditions, the use of a portion of the income for investments that are readily salable and of stable value is highly desirable. Such reserves are then available if needed in times of less favorable returns.

In view of the increasing world production of wheat and the probable lower level of prices, special caution should be exercised in expanding wheat production in those areas where limited rainfall and other uncertain factors make wheat growing particularly precarious. Expansion within these areas, if at all advisable, should be undertaken only by those thoroughly familiar with the conditions and the hazards involved.

APPENDIX

TABLE 10.—*International trade in wheat, including flour: Average, 1910–1914, annual, 1926–1929*

[In thousand bushels—i. e., 000 omitted]

Country	Year ended June 30									
	Average 1910–1914		1926		1927		1928		1929, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES										
Canada	447	94, 286	372	320, 649	408	304, 948	476	305, 658	1, 331	422, 732
United States	1, 834	107, 103	15, 679	108, 035	13, 264	219, 160	15, 734	206, 259	21, 442	163, 687
Argentina	[1] 3	85, 220	15	99, 803	14	138, 240	2	178, 135	-------	[2] 215,603
Australia	[1] 7	49, 732	3	77, 234	4	96, 584	1	72, 962	-------	107, 937
British India	332	50, 821	1, 777	9, 618	2, 899	12, 598	2, 310	15, 668	27, 417	5, 690
Hungary	[3] 7, 214	[3] 49, 116	34	19, 345	1	21, 143	2	22, 135	1	23, 658
Russia	[3] 556	[3] 164, 862	0	27, 085	0	49, 200	0	4, 867	-------	-------
Yugoslavia	0	0	0	[4] 11, 549	-------	10, 029	-------	1, 024	27	7, 919
Rumania	[3] 196	54, 630	280	8, 558	[3] 1	[3] 11, 038	[3] 0	[3] 7, 431	0	[4] 1, 570
Algeria	[3] 639	[3] 5, 936	[3] 1, 182	6, 007	[3] 3, 584	2, 182	[3] 1, 597	6, 351	-------	-------
Chile	[1] 170	[1] 2, 593	731	1, 696	758	516	622	585	91	757
Tunis	[3] 1, 746	[3] 960	611	3, 437	1, 142	1, 970	1, 127	629	-------	-------
Bulgaria	[3] 0	[3] 11, 182	[3] 5	4, 128	[3] 1	2, 236	-------	2, 125	-------	-------
Spain	6, 009	71	1, 466	683	56	985	-------	-------	-------	-------
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	219, 474	3, 736	201, 313	13, 420	226, 908	10, 292	222, 270	11, 181	215, 140	11, 158
Italy	56, 431	3, 637	66, 339	2, 469	88, 184	1, 034	87, 905	1, 111	91, 941	2, 197
Germany	91, 851	23, 300	76, 410	20, 252	99, 252	5, 735	98, 557	6, 798	86, 162	17, 669
France	44, 081	1, 230	35, 978	1, 955	53, 878	592	53, 987	132	51, 553	116
Belgium	72, 877	21, 965	42, 722	3, 701	41, 236	1, 378	44, 848	2, 618	43, 796	2, 505
Netherlands	[3] 80, 702	[3] 58, 435	29, 150	1, 699	29, 060	867	31, 532	586	29, 529	709
Brazil	[1] 20, 495	[1] 0	29, 153	-------	30, 255	-------	34, 653	-------	36, 244	-------
Japan	[3] 4, 116	[3] 28	27, 980	4, 899	18, 458	4, 014	21, 995	4, 859	28, 203	10, 768
China [5]	6, 691	5, 401	10, 162	1, 343	22, 354	374	15, 464	1, 464	20, 238	4, 265
Czechoslovakia	0	0	19, 388	212	21, 085	89	21, 323	41	17, 248	56
Austria	[3] 11, 402	[3] 871	14, 822	[6] 171	16, 888	89	16, 230	165	14, 903	59
Switzerland	[3] 16, 937	[3] 14	14, 245	0	17, 220	0	18, 427	0	15, 496	0
Greece	[1] 7, 035	[1] 2	18, 003	0	19, 502	0	19, 106	0	22, 144	0
Irish Free State	0	0	18, 539	90	19, 511	37	18, 691	56	17, 905	110
Sweden	[3] 7, 080	[3] 23	6, 677	639	8, 484	2, 576	10, 391	1, 660	10, 553	3, 076
Egypt	[3] 8, 244	[3] 59	12, 520	26	8, 861	64	6, 803	433	12, 906	181
Denmark	[3] 7, 155	[3] 597	6, 886	897	7, 695	1, 085	10, 701	220	17, 149	110
Poland	0	0	3, 460	5, 080	8, 331	833	7, 840	225	3, 865	106
Union of South Africa	[1] 6, 274	[1] 253	6, 063	15	4, 110	8	8, 212	8	8, 141	8
Norway	[3] 3, 674	[3] 0	6, 346	[3] 5	5, 944	[3] 4	6, 862	[3] 4	8, 538	-------
Cuba	4, 248	0	5, 773	0	5, 695	0	5, 740	0	-------	-------
Finland	[1] 4, 919	[1] 0	4, 879	0	4, 854	0	5, 499	0	6, 095	0
New Zealand	[1] 163	[1] 918	2, 978	1	2, 769	1	1, 032	1	793	2
Syria and Lebanon [4]	0	0	3, 168	0	1, 980	0	-------	-------	-------	-------
Latvia	0	0	[4] 1, 579	[3] 2	[4] 1, 690	[3] 50	-------	-------	-------	-------
Indo-China	0	0	[4] 1, 094	[4] 0	[4] 1, 143	[4] 0	1, 073	0	-------	-------
Estonia	0	0	952	0	902	0	1, 062	0	1, 176	0
Ceylon [4]	0	0	896	0	927	0	-------	-------	-------	-------
Total, 42 countries	692, 995	796, 981	687, 929	754, 725	790, 196	899, 991	789, 527	850, 527	673, 301	989, 018

Bureau of Agricultural Economics. Official sources except where otherwise noted.

[1] Average of calendar years 1909–13.
[2] Trade sources.
[3] Year ended July 31, International Yearbook of Agricultural Statistics.
[4] International Crop Report and Agricultural Statistics.
[5] Year ended Dec. 31.
[6] International Yearbook of Agricultural Statistics.

TABLE 11.—*Wheat production, average, 1909–1913 and 1923–1927, annual 1928–1930*

[In thousand bushels—i. e., 000 omitted]

Country	Average, 1909–1913	Average, 1923–1927	1928	1929	1930, as of July 1
NORTH AMERICA					
United States	690,108	809,668	914,876	806,508	[1] 532,469
Canada	197,119	403,714	566,726	299,520	----------
Mexico	[2] 11,481	11,090	11,031	11,333	11,572
Guatemala	(200)	201	167	152	----------
Total	898,908	1,224,673	1,492,800	1,117,513	----------
EUROPE					
England and Wales	55,770	52,057	47,264	47,460	----------
Scotland	2,273	2,137	2,315	2,165	----------
Northern Ireland	287	191	183	142	----------
Irish Free State	1,310	1,111	1,186	1,184	----------
Norway	306	552	798	729	----------
Sweden	8,103	11,727	19,155	19,031	----------
Denmark	6,322	8,529	12,214	11,721	----------
Netherlands	4,976	5,646	7,336	4,666	----------
Belgium	15,199	13,988	17,215	13,225	[3] 15,873
Luxemburg	615	408	713	305	----------
France	325,644	278,997	281,285	319,863	----------
Spain	130,446	146,581	119,885	154,249	160,568
Portugal	[4] 11,850	11,250	7,546	11,110	----------
Italy	184,393	210,456	228,598	260,669	220,000
Malta	196	279	289	293	----------
Switzerland	3,314	3,766	4,270	5,791	----------
Germany	131,274	105,962	141,593	123,073	----------
Austria	12,813	9,890	12,915	11,582	----------
Czechoslovakia	37,879	37,821	51,499	52,902	----------
Hungary	71,493	68,558	99,211	74,985	81,129
Yugoslavia	62,024	65,096	103,294	94,998	----------
Greece	[4] 16,273	10,620	13,085	8,502	----------
Bulgaria	37,823	34,771	49,153	34,448	----------
Rumania	[2] 158,672	96,980	115,544	101,200	123,715
Poland	61,665	53,967	59,219	65,862	----------
Lithuania	3,284	4,204	6,327	9,329	----------
Latvia	1,475	1,977	2,499	2,336	----------
Estonia	364	799	1,037	1,268	----------
Finland	137	879	998	1,095	----------
Total	1,346,160	1,239,289	1,406,626	1,434,183	----------
AFRICA					
Morocco	(17,000)	22,693	24,746	26,885	----------
Algeria	35,161	27,542	30,302	33,307	29,174
Tunis	6,224	9,627	12,125	12,309	9,002
Egypt	33,662	38,513	37,296	45,228	----------
Total	92,047	98,375	104,469	117,729	----------
ASIA					
India	351,841	344,729	290,864	317,595	386,848
Syria and Lebanon	(4,000)	13,115	6,490	16,343	----------
Japan	23,635	27,521	30,812	30,496	----------
Chosen	6,898	9,736	8,595	8,320	----------
Total	386,374	395,101	336,761	372,754	----------
Total Northern Hemisphere	2,723,489	2,957,438	3,340,656	3,042,179	----------
SOUTHERN HEMISPHERE					
Chile	20,062	26,628	29,679	37,037	----------
Argentina	147,059	228,492	307,362	137,435	----------
Union of South Africa	[4] 6,034	7,307	6,693	10,273	----------
Australia	90,497	136,604	159,657	125,669	----------
New Zealand	6,925	6,347	8,833	7,100	----------
Total	270,577	405,378	512,224	317,514	----------
Total, 46 countries	2,994,066	3,362,816	3,852,880	3,359,693	----------
Estimated world total excluding Russia and China	3,041,000	3,451,000	3,973,000	3,459,000	----------
Russia	758,941	672,678	793,289	738,908	----------

[1] Winter only. Production of winter wheat in 1929 was 578,336,000 bushels.
[2] 4-year average.
[3] Winter only, about 99 per cent of the total crop.
[4] 1 year only.

TABLE 12.—*Wheat acreage in specified countries, average, 1909–1913, and 1923–1927, annual 1928–1930*

[In thousands acres—i. e., 000 omitted]

Country	Average 1909–1913	Average 1923–1927	1928	1929	1930
NORTH AMERICA					
United States	47,097	55,941	58,272	61,103	59,024
Canada	9,945	22,018	24,119	25,255	24,730
Mexico	[1] 2,174	1,637	1,283	1,293	1,224
Guatemala	----------	24	20	18	13
Total	59,216	79,620	83,694	87,669	84,991
EUROPE					
England and Wales	1,787	1,603	1,396	1,330	1,346
Scotland	57	56	58	51	----------
Northern Ireland	8	6	5	4	----------
Irish Free State	35	31	31	29	----------
Norway	12	23	23	----------	----------
Sweden	255	398	562	574	----------
Denmark	154	216	252	257	----------
Netherlands	138	138	148	112	144
Belgium	404	359	408	356	----------
Luxemburg	27	27	37	21	32
France	16,500	13,440	12,956	12,749	12,950
Spain	9,547	10,638	10,479	10,622	10,530
Portugal	[2] 1,211	1,055	1,102	----------	----------
Italy	11,793	11,769	12,233	12,172	11,900
Malta	9	9	9	9	----------
Switzerland	105	115	127	121	----------
Germany	4,029	3,878	4,269	3,955	4,373
Austria	635	489	514	511	----------
Czechoslovakia	1,718	1,584	1,867	2,017	2,112
Hungary	3,712	3,608	4,144	3,795	----------
Yugoslavia	3,982	4,218	4,683	5,131	5,245
Greece	[2] 1,134	1,180	1,329	1,129	----------
Bulgaria	2,409	2,542	2,813	2,617	2,899
Rumania	[3] 9,515	7,705	7,923	6,764	7,122
Poland	3,343	3,190	3,187	3,525	----------
Lithuania	211	258	333	488	----------
Latvia	85	120	164	145	----------
Estonia	23	55	70	82	----------
Finland	8	39	46	47	51
Total	72,846	68,749	71,263	[4] 68,614	----------
AFRICA					
Morocco	(1,700)	2,439	2,665	2,843	2,757
Algeria	3,521	3,492	3,656	3,795	3,620
Tunis	1,310	1,554	2,011	1,730	1,730
Egypt	1,314	1,504	1,590	1,614	----------
Total	7,845	8,989	9,922	9,982	----------
ASIA					
India	29,224	31,117	32,193	32,011	31,347
Syria and Lebanon	(900)	1,366	1,024	899	1,154
Japan	1,179	1,160	1,201	1,213	----------
Chosen	574	887	896	874	----------
Total	31,877	34,530	35,314	34,997	----------
Total Northern Hemisphere	171,784	191,888	200,193	201,262	----------
SOUTHERN HEMISPHERE					
Chile	1,003	1,547	1,715	1,758	1,646
Argentina, area sown	16,051	18,826	21,300	19,430	----------
Union of South Africa	[2] 803	858	984	933	----------
Australia	7,603	10,907	14,840	14,093	[5] 17,000
New Zealand	241	195	255	234	----------
Total	25,701	32,333	39,094	36,453	----------
Total 46 countries	197,485	224,221	239,287	237,715	----------
Estimated world total excluding Russia and China	204,200	230,700	244,800	244,400	----------
Russia	74,209	61,572	71,879	75,721	----------

[1] 2-year average. [2] 1 year only. [3] 4-year average.
[4] Excludes Norway and Portugal for which estimates are not available. [5] Unofficial.